

CREATIVE ENGINEERING LABORATORY, MECHANICAL ENGINEERING DEPARTMENT

CASE STUDY ARCTURUS IV

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CAMBRIDGE 39, MASSACHUSETTS



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INTER-OFFICE MEMO

Massachusetts Intergalatic Traders, Inc.

From: General Manager To: All Employees
Subject: Confidential Reports File No. 3463

A great deal of the material in our office files is of an extremely confidential nature and not to be disclosed to unauthorized persons. The penalties for such disclosure are very severe both from the company and government.

This sheet should, therefore, appear as the first sheet of any file confidential material and serve as a warning to persons not cleared to receive such. Any person not cleared who reads further in this file does so at their own risk and is subject to the extreme penalty of the law.

CONFIDENTIAL

INTER-OFFICE MEMO

Massachusetts Intergalactic Traders, Inc.

From: General Mgr.

To: All Employees

Subject: Time for Records

File No. 3453

Please note that all time used in letters and reports is referred back to Terran time at Cambridge. All M.I.T.3 ships and Branch offices must keep at least one calendar chronometer, measuring Terran time.

Minute of 60 seconds

Hour of 60 minutes

Day of 24 hours - 1 O'clock is first hour after midnight

Week of seven days

Month of four weeks

Year of thirteen months

Year Day between 28 December and 1 January

Every fourth year - Leap year day between 28 June and 1 Jul.

CONFIDENTIAL

massachusetts
intergalactic
traders, inc.

INTERGALACTIC CODE NO. 76
ADDRESS MITI

78 massachusetts avenue - cambridge, massachusetts - terran

3 May 2951

OFFICE OF THE
BOARD CHAIRMAN

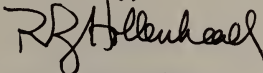
K Wad Lee, Director General
T. E. C. H.
Hexagon Bldg., 187 Level
Washington 99, Terran

CONFIDENTIAL

Dear K W:

I noticed on last nite's Newscope the announcement of the discovery of intelligent life on Arcturus IV. As you know, our company has been actively engaged for some time now in galactic trading and are well equipped for the design, manufacture and distribution of machines and products for human and sub-human use. Our recent expansion program qualifies us to handle new virgin territory and I would appreciate it very much if you could send us a copy of your file on the α Bootis system and, as in the past, keep us informed as to changes and additions to this file.

Cordially,



R. Z. Hollenhead
Chairman of the Board

COPY

TERRAN

EXPORTING

COUNSEL

INTERGALACTIC CODE NO. 18
ADDRESS TECH

HEADQUARTERS

Hexagon Building - 187 Level - Washington 99 - Terran

14 May 2951

R. Z. Hollenhead
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Massachusetts

Dear Zepp:

Enclosed you will find copies of the file you requested on α Bootis. I think you are dammed smart to get in on the ground floor on this new planet. Information about Arturus IV is very sketchy at this date, but what we have looks promising. We, of course, will keep you informed on new information as it comes in and you do the same with us.

I hope, you are planning to attend the Galactic Exporters Convention this fall so that I can have the pleasure of seeing you and your charming wife again. Maybe, we can ditch the girls again like we did three years ago on another "Technological Toot".

Cordially,



K. Wad Lee
Director General

CONFIDENTIAL

Received
Mass. Intergalactic Traders
17 May. 2951

TERRAN

EXPORTING

COUNSEL

INTERGALACTIC CODE NO. 18
ADDRESS TECH

HEADQUARTERS

Hexagon Building - 187 Level - Washington 99 - Terran

26 Sol 2949

Solar and Galactic Explorers Union
Local 257
East Atom 82,
Saturn

Gentlemen:

In a recent director's meeting we were discussing and reviewing the progress of exploration in our Galaxy. We noted that little work has been done in the α Bootis region. We feel that this territory might well be explored with good chance of profitable return. It is close enough to Terran and not too far off established routes into deep space.

Please keep this suggestion in mind and when time permits look into it. Any expense involved will be covered in our usual manner but will double the bonus paid for the discovery of intelligent life.

Yours very truly,



K Wad Lee
Director General

CONFIDENTIAL

Received
Mass. Intergalactic Traders
1 July 2951

Solar and Galactic Explorers Union

Local 257

14 March 2951

SATURN BRANCH
EAST ATOM 82

Mr. K. Wad Lee
Director T.E.C.H.
Hexagon Bldg., 187 Level
Washington 99, Terran

CONFIDENTIAL

Dear Sir:

The suggestion in your letter of 26 Sol 2949 that investigation of the Arcturus Region might prove fruitful was a good one. I have just returned from that region having made contact with at least one planet containing sub-human intelligent life. It is a rather amazing planet as you can see from the attached form. The natives were friendly and welcomed Terran contact, but the conditions there make it very rugged for human existence.

Trade possibilities seem unlimited, the state of culture reminding one very much of the descriptions of early 20th century America that I used to read about in our history books. Large deposits of pure uranium and platinum could provide more than adequate repayment for any goods and services that we exchange with them.

My contact with them was relatively short because of the extreme living conditions and other urgent matters. I landed near the largest city observed in quick flight around the planet. This city is called Snafus and the inhabitants are of a race called Methanians, a queer lot apparently evolved from birds (see photo in report). This planet is the fourth out from Arcturus. Six planets are known to the Methanians, but there are undoubtedly more. I only had time to visit briefly one other planet (report attached) but no life of any kind was found. I wish I had though as you'll see from the report, conditions in Arcturus III are very similar to Terran conditions except for high radioactivity.

I recommend highly that you advance the contact with Arcturus IV as it will be very profitable. These detailed investigations should be carried out by your staffs and I suggest that the first group consist of a goodly number of construction engineers to establish permanent headquarters. There is no wood on the planet but ample supplies of stone, brick, and most metals are available.

Kindly deposit bonus check (double you recall) and expense check for 43,000 credits to my account in Third Bank of Terran, Saturn Branch. If I can be of service in any other way, please do not hesitate to call on me.

Received
Mass. Intergalactic Traders
17 May 2951

Yours in space,

Gare E. Toff
Gare E. Toff
Licensed Explorer
License No. 3470

EXTRA-SOLAR PLANET REPORT

Terran Exporting Counsel Headquarters

SUN α Bootis SPECTRAL CLASS Ko LUMINOSTY 83X MASS 6×10^{33} grams
DIAMETER 19×10^6 miles SURFACE TEMP. 4000° Abs DISTANCE 33 L.Y.
PLANET NAME _____ NUMBER III FILE NO. 3463
FIRST CONTACT 10 Jan 2951 BY Gare E Toff
DISTANCE (from sun) 880×10^6 miles MASS 12×10^{27} grams DIAMETER 17.6×10^6 meters
ACC. OF GRAVITY (cgs) 1038 SIDERIAL PERIOD (Terran time) 16.82 years
LENGTH OF DAY (Terran time) 24 hours DAYS IN YEAR (Local time) 6140
MEAN TEMP. (Winter) ? MEAN TEMP. (Summer) ?
LIFE None TRADE POSSIBILITIES None

REMARKS & FOLLOW-UP

- 1.) Atmosphere - **similar** to Terran but radioactivity high.
- 2.) Temperature when I was there was mild +20°C but do not know if this is winter or summer.
- 3.) Data above obtained from astronomers on Arcturus IV.
- 4.) Conditions on this planet ideal for human life except for high radio-activity.
- 5.) Looks as if some atomic disruption destroyed all life forms at some time or another on this planet.
- 6.) Suggest archeological investigations be carried out here when time permits.

CONFIDENTIAL

COPY

Received
Mass. Intergalactic Traders
17 May 2951

EXTRA-SOLAR PLANET REPORT

Terran Exporting Counsel Headquarters

SUN α Bootis SPECTRAL CLASS Ko LUMINOSITY 83X MASS 6×10^{33} grams
DIAMETER 19×10^6 miles SURFACE TEMP. 4000° Abs DISTANCE 33 L.Y.
PLANET NAME Arcturus IV NUMBER IV FILE NO. 3463
FIRST CONTACT 22 Jan. 2951 BY Gare E. Toff
DISTANCE (from sun) 1800×10^6 miles MASS 60×10^{27} grams DIAMETER 12×10^6 meters
ACC. OF GRAVITY (cgs) 11,000 SIDERIAL PERIOD (Terran time) 49.4 years
LENGTH OF DAY (Terran time) 159 hours DAYS IN YEAR (Local time) 2720
MEAN TEMP. (Winter) -110°C MEAN TEMP. (Summer) -50°C
LIFE Intelligent-sub-human TRADE POSSIBILITIES Excellent

REMARKS & FOLLOW-UP

- 1.) Atmosphere is largely methan and strangely enough the name of the local races translates to methanian.
- 2.) State of Culture - early 20th century, say around 1905, America.
- 3.) Intelligent life extremely friendly. Quite short (height of male in picture 4' - 6") - apparently evolved from birds - covered with feathery type fur. - third eye seems to extend visual perception over much greater range than we are capable of. Hearing is much more acute in both high and low frequencies.
- 4.) Many different types of domestic animal life in evidence.
- 5.) Plant life is all low growing (similar to our mosses) and is apparently part of the root system of the plant. The edible portions of the plant are under ground at considerable depth. The blossoming and fruiting takes place under ground, pollinization being accomplished by worms similar to our earth worms.
- 6.) Due to high pressures, gravity and extreme cold the inhabitants move very sluggishly. This extreme slow pace is hard to adjust to.

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Received
Mass. Intergalactic Traders
17 May 2951

TERRAN

EXPORTING

COUNSEL

INTERGALACTIC CODE NO. 19
ADDRESS TECH

HEADQUARTERS

Hexagon Building - 187 Level - Washington 99 - Terran

20 March 2951

Memo To: J. H. Rones, Director of Engineering
J. R. Nold, Director of Design and Production
J. S. Wick, Director of Psychology & Physiology

Gentlemen:

Enclosed you will please find a copy of the letter from Gare E. Toff announcing first contact with the Planet Arcturus IV and his reports on the same. In accordance with established policy you will prepare plans for an immediate thorough investigation of this planet so that it can be announced to the public as soon as possible. Remember, of course, until public announcement is made, all plans must be kept perfectly secret.

Read the reports very carefully noting the extreme conditions existing on planet IV and make your plans accordingly. I would like to have a permanent Headquarters established and built as quickly as possible so sufficient men and supplies should be taken along for this purpose. At the same time a careful study of the physical aspects of the country and culture should be carried out by the General Engineering group.

The Psychological and Physiological group should make a complete survey of the animal and intelligent life so that we can advise all interested Terran trading companies. Do not, of course, overlook the spiritual, moral and psychological aspects of their culture and try to evaluate the effect of Terran contact on same. The Design and Production group should concern themselves with the material side of their culture so that we can lay out a program for a future trading program.

Expense under "Project Arcturus" should be charged to order No. XKo-4139-A. Flight zero hour should not be later than 6:30 25 March.

K Wad Lee
Director General

CONFIDENTIAL

Received
Mass. Intergalactic Traders
17 May 2951

TERRAN

EXPORTING

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HEADQUARTERS

Hexagon Building - 187 Level - Washington 99 - Terran

INTERGALACTIC CODE NO. 18
ADDRESS TECH

GENERAL ENGINEERING DIVISION
J. H. RONES, DIRECTOR

20 April 2951

CONFIDENTIAL

K. Wad Lee
Director General

Dear Sir:

Since the space ship must be sent back to Terran for more supplies, men and equipment I am taking this opportunity to tell you of our progress on Arcturus IV to date.

As you know we left the Space port at Washington at 6:00, 24 March, one day ahead of schedule and after an uneventful 12 day flight we safely reached Arcturus IV. We circled the planet once and had little difficulty locating the city of Snafu reported by Toff. It is in the northern hemisphere of the planet on a large plain ranged with very rugged mountains.

On landing we were greeted by A. Yutaka, the Governor of Snafu, and some of the other city dignitaries. They had been expecting and waiting for another visit from Terran men ever since Gare E. Toff departed last February. They were even more friendly than we had expected or hoped for and did everything in their power to make us comfortable. We experienced little difficulty in conversing with them thru our space suit phones and found we could keep up with their extremely slow pace even under the high pressures and G, thanks to the new Hi-G Space suit Design. We had some difficulty in regulating temperature at first. It was only -100°C the day we landed.

Yutaka appointed J. Burgweiss his liaison officer and with his cooperation a site for the new headquarters was chosen and procurement of materials for construction ordered. Native workers were provided and work on the building progressed rather rapidly considering the pace of the workers. Our men worked in shifts, all taking part in the construction work. We Terranians worked eight hours and slept eight hours. The Methanians worked throughout their day, now 80 hours long, and then took the remaining 79 hours off, they would not work nights.

The building follows the attached plan and the walls are three ply stone and brick with a vermiculite type of insulation and a thin aluminum gas seal. The floors, partitions and roof are aluminum sheet on prefabricated joists and studs. The entrances are triple sealed locks and the windows are quadruple thermopane with heated methane circulating in the spaces to cut down bodily radiation loss to these areas.

TERRAN

EXPORTING

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HEADQUARTERS

Hexagon Building - 187 Level - Washington 99 - Terran

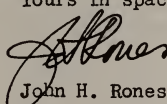
INTERGALACTIC CODE NO. 19
ADDRESS TECH

GENERAL ENGINEERING DIVISION
J. H. RONES, DIRECTOR

Office space, storage space, recreation space, and living space for 200 humans is being provided in a heated, partially degravitized, oxygen atmosphere. We are also providing for two large conference rooms or show rooms heated to only -50°C and having a methane atmosphere to accommodate our Methanian friends.

We hope that it will not be too long before the work is at such a point that we can release some of our men to start the research programs originally planned. Please see that the list of materials and supplies that the space ship captain has is quickly obtained and shipped back to us. Jack Nold and Jim Wick join me in sending you our best regards.

Yours in space,


John H. Rones
Director, Project Arcturus

CONFIDENTIAL

Received
Mass. Intergalactic Traders
17 May 2951

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INTER-OFFICE MEMO

Massachusetts Intergalatic Traders, Inc.

17 May 2961

From: RZH

To: J Sapmill

Subject: Arcturus IV

File No. 3463

I have just received the enclosed file from T.E.C.H. and suggest you look it over very carefully. This looks like a wonderful opportunity for our company to get in on the ground floor. Here is a large planet, inhabited by an intelligent people of a relatively backward culture. Without too much trouble on our part we should be able to design and build a wide range of machines and products that they can use. There will be, of course, some technical difficulties but I am sure that our engineering and design staff can solve them.

Before we have a company conference on programing our entrance into this market, I would like to have a first hand report on the general conditions there. With your past experience, Joe, you're the man to do this job. Your long interest in 20th century Terranian history should make you sympathetic to the culture on Arcturus IV.

Check with Peggy on the best route and accommodations. I feel that probably for a slight extra charge the Spica flight might be diverted off its course a little and let you off at Arcturus IV. I have checked with T.E.C.H. and they say that their headquarters is now ready for guests. Charge all expenses to order No. OK 2734, and good luck to you in space.

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TERRAN

EXPORTING

COUNSEL

INTERGALACTIC CODE NO. 19
ADDRESS TECH

HEADQUARTERS

Hexagon Building - 187 Level - Washington 99 - Terran

27 July 2951

PSYCHOLOGY & PHYSIOLOGY DIV.
J. S. WICK, DIRECTOR

CONFIDENTIAL

R. Z. Hollenhead
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Mass.

Dear Sir:

At the request of our Director K Wad Lee, I am sending you a copy of our report on Arcturus IV. This, of course, is just a brief survey of Sub-Human type SH-1406-A and it will be followed with more detailed information as our group progresses in our analysis of intelligent life on this planet.

The work is progressing as rapidly as can be expected, considering the extreme conditions under which we have to work. The natives seem to be extremely cooperative and their government welcomes the opportunity of Galactic contact. Any specific information that you desire not covered in this or subsequent reports will be obtained, if at all possible, on receipt of your request.

Respectfully,

J. S. Wick

J. S. Wick, Director

Received
Mass. Intergalactic Traders
2 Aug. 2951

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE 25 July 2951

FROM J. S. Wick

TO K. Wad Lee

SUBJECT SH-1046-A

FILE NO. 3463

This is the first report of the Psychological and Physiological Division attached to Project "Arcturus" and operating under order No. XK0-4139-A issued by the Director General. Up to 1 June 2951 the majority of our Division was engaged in helping the General Engineering Division with the planning and construction of the permanent Headquarters on the outskirts of Snafu. Shortly before that work was finished, the writer and two others started laying out a research program in the Psychological and Physiological fields. Our work has now been going on for almost two months and we are ready with this interim report.

As has been stated before, the Methanians are a friendly cooperative people in spite of the somewhat backward culture. Unfortunately they are not the only race inhabiting Arcturus IV and from what we have been able to learn there are other less friendly people to deal with. A good share of the information and data in this report has been obtained from Methanian libraries. It is supplemented and checked by our own anthropometric measurements and psychological tests.

Figure I shows the average skeletal dimensions of the Methanian male of two Arcturian years (98.8 Terran years). The average female height is 4'-0". Physical maturity is reached in one Arcturian year and senility sets in in about 10 Arcturian years. There are very few old people, however. The severity of their physical surroundings combined with their own physical limitations prevents the great majority from reaching old age.

Strangely enough the Methanian metabolic process is similar to Terran plant life. Carbon is obtained from the Methane atmosphere and oxygen from the plant and animal life eaten as food. There is no liquid water anywhere on the planet and due to the very cold temperature, little in the atmosphere. That that is present is in the solid state resulting in a foggy condition both winter and summer. Amonia is the Arcturian substitute for water.

The Methanians weigh very little compared to us. One of the largest we met was weighed on a Terranian spring scale at 187 pounds. Their bones are hollow and apparently filled with hydrogen and helium. There is no question but these people have evolved from a race of bird-men, their appearance seems to indicate it, their history seems to prove it. Their long arms and claw like hands are vestiges of once great wings. The only anomaly is their single-toed feet like that of a horse. This adaption to ground living evolved very rapidly once the power of flight was lost.

The young are born in eggs and the eggs are carried around in skin pockets or pouches similar to those of the now extinct Terranian Penguin until the egg hatches. Both male and female take turns in the hatching process. The young grow rapidly, at first, and are ready to take care of

themselves in about 20 Terranian years. They, however, seldom leave home before physical maturity is reached (49.4 years).

The Arcturian normal body temperature is -40°C and their pulse rate is 5 times per minute. As a result they are very slow moving and they frequently walk using one or both arms as a cane or pair of crutches. Their normal walking pace is about $1/4$ mile / hour, but if pressed they can go almost eight times this fast for very short periods. Even with Hi-G units we don't travel much faster than they do. This slow pace does not seem to bother them since their whole system is similar, their stimulus-response time is about 2 seconds.

Their auditory, vocal and visual range is extremely large. They can hear sounds with frequencies as low as $1/100$ cycle/second up to 50,000 cycles/second. Their vocal range goes from $1/50$ to 25,000 cycles/second and their visual range extends from the infra red up thru the ultra-violet.

As you might expect they are very stable emotionally, very slow to anger and with tremendous patience measured by our standards. They have a limited amount of telepathetic ability but seem to use this form of communication only under duress. In the ESP tests we thought we had discovered a race with exceptional talent but later found out that their high (almost perfect) scoring was due to the X-ray like vision of the third eye.

They are monogamous and divorce is not known. They are extremely gregarious and even the farmers live in little centralized communities. Their religion is monotheistic (and without a devil) and their music, literature and art is well advanced.

All in all they are a very interesting people and well worth a great deal more study. Subsequent reports will attempt to go into a great deal more detail.

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Received
Mass. Intergalactic Traders
2 Aug. 2951

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE 14 MAR 2951

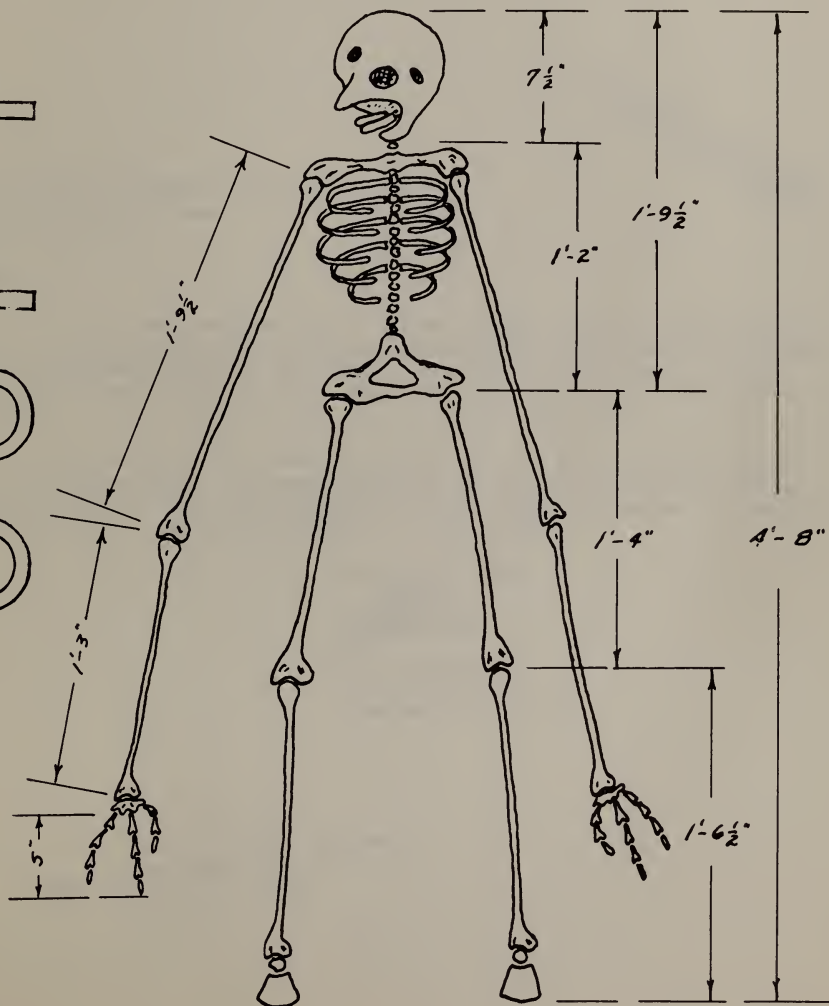
FROM GARE E. TOFF

TO K. WAD LEE - T.E.C.H.

SUBJECT METHANIAN MALE

FILE NO. 3463

COPY



SUB-HUMAN TYPE * 1046-A
ARCTURUS IV

TERRAN
EXPORTING
COUNSEL
HEADQUARTERS

INTERGALACTIC CODE NO. 10
ADDRESS TECH

Hexagon Building - 187 Level - Washington 99 - Terran

5 August 2951

GENERAL ENGINEERING DIVISION
J. H. RONES, DIRECTOR

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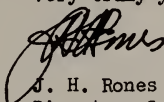
R. Z. Hollenhead
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Mass.

Dear Sir:

I have just returned from a rather extended sojourn on Arcturus IV, completing the construction of the permanant headquarters there and carrying out a preliminary survey of the physical aspects of the planet. Enclosed is a copy of our Division's first report which, I understand, you have requested.

It is difficult to describe in such a brief report all the wonders of this strange world. You must experience the thrill first hand in order to appreciate it. The trip thru space is not a difficult one and our headquarters provide extremely comfortable accommodations.

Very truly yours,



J. H. Rones
Director, General
Engineering Division

Received
Mass. Intergalactic Traders
8 Aug 2951

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE 4 August 2951

FROM J.H.R.

TO K. Wad Lee

SUBJECT Arcturus IV

FILE NO. 3463

General Engineering Report

The construction of the permanent headquarters has now been completed according to plans and specifications on file in this office. All mechanical equipment is adjusted and running smoothly providing all the comforts of Terran. This report will deal primarily with the physical aspects of Arcturus IV.

The dimensions of this world have been given (See Extra-Solar Planet Report) but a more detailed report is necessary for future traders and travelers. The world is an extremely large one and only a small part has been investigated by this Division. The libraries of the Methanians, however, contain a wealth of reference material and this has been helpful in preparing this report.

The surface of the planet is about equally divided between land and sea. The liquid in this case being amonia, the large oceans do not freeze in the winter time but all the small lakes and rivers do. The rainfall in all but the torrid zones is very slight so that irrigation has to be practiced by the farmers for their crops. In addition to the amonia large pools or lakes of Tetrasilicance (Six H₂O) are scattered over the surface. This fluid in conjunction with the amonia is used to irrigate the crops.

The Methanians live on a very large continent in the northern half of the western hemisphere. It is about 4 times the size of North America and inhabited by over 500 million people. The topography, for the most part, consists of large flat plains ringed by high rugged mountains. These plains range in size from a few hundred square miles to about 100,000 square miles. The city of Snafu is located centrally in one 95,000 square miles. The population of Snafu is 15,500,000 and the only city as such in this plain. The farmers live in small groups (ten to twenty families) scattered all over the rest of the plain. They have no local government, all paying taxes and receiving protection from the city of Snafu (City and Plain have the same name)

Most all of the rivers and lakes are spring fed and many of them run from one plain to the next thru large underground passageways. These rivers provide cheap and easy transportation.

The metabolic processes of both plant and animal life are very interesting. The plant life in effect grows upsidewown. The root structure extending into the atmosphere where it obtains some oxygen from the CO₂ present, nitrogen and hydrogen from the NH₃ and gives off methane (CH₄) in rather large quantities. The lower fruiting portion of the plants extend in some

cases to considerable depth (making the harvesting very difficult) tho usually to a depth of only two or three feet. Additional oxygen is taken in by the plants from the oxides in the soil along with the necessary carbon and silicon. The soil must be kept moist all of the time of their growing season with the tetrasilicance in order to prevent freezing. The plants and their fruit are very rich in oxygen which when eaten by the animal life and in combination with the methane they breathe provides the exothermic process necessary for the maintenance of life. The combustion products are mainly CO_2 and NH_3 and H_2O .

Most of the wild animal life that is herbivorous is of the burrowing rodent type and the ground is honeycombed with their tunnels. Control of these animals is a serious problem to the farmers. Herbivorous domestic animals have been evolved that graze on the root portions of the plants, but this grazing must be carefully controlled or the plant life will be destroyed.

There is no wood of any type on the planet so cellulose products are unknown. All textiles are mineral or silicon derivatives or synthetics. Building materials are stone, brick, metal or synthetics.

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Received
Mass. Intergalactic Traders
8 Aug, 2951

TERRAN

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INTERGALACTIC CODE NO. 18
ADDRESS TECH

Hexagon Building - 187 Level - Washington 99 - Terran

DESIGN & PRODUCTION DIVISION
J. R. NOLD, DIRECTOR

7 August 2951

CONFIDENTIAL

Mr. R. Z. Hollenhead
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Massachusetts

Dear Dr. Hollenhead:

Enclosed you will find a copy of my first report on the marketing and production opportunities on Arcturus IV. The report, of necessity, is brief but, I hope, to the point. As further investigations are carried out we will be glad to send you additional information.

Your man J. Sapmill was very helpful to us in our work and his report will probably be more specific than our general observations.

Sincerely yours,



J. R. Nold
Director of Design
and Production Division

Received
Mass. Intergalactic Traders
10 Aug. 2951

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE 5 August 2951

FROM J. R. Nold

TO K. Wad Lee

SUBJECT Arcturus IV

FILE NO. 3463

Received

MARKETING AND PRODUCTION REPORT Mass. Intergalactic Trade
10 Aug. 2951

The scope of our investigation is so large that it is almost impossible to go into any detail in the description of the Methanian culture from the standpoint of products and machine development. This report, then, will be extremely general in nature. Requests received for any specific information are welcomed and this information will be promptly supplied from our files or from our representatives in Snafu.

The material culture is a rather strange mixture, being quite advanced in some fields and slow, if not completely non-existent in other fields. For example, the use of atomic power for the generation of electricity for heating, lighting and conversion to mechanical work is widely known and used, but the field of electronics is completely missing. Considerable use of electricity for heating occurs in the farming and outlying districts of the large cities. In the cities themselves, ammonia vapor from the cooling coils of the large atomic piles, is piped from house to house as the heating media. It also has the advantage that it can be used as a drinking fluid as well. In the summer time it serves as a cooling medium.

The previous reports that the culture is similar to early 20th century America is somewhat misleading due to the anomaly above and others like it. What previous reporters referred to was probably the fact that the Industrial Revolution of the Methanians is just getting under way in full swing. There is still a great deal of craftwork being carried out, but large factories are beginning to take over more and more. Steel and iron has nowhere near the importance here that it has on Terran because of its extreme density and weight. Aluminum, magnesium and titanium are widely used as are the various plastics. Lithium is very scarce on Arcturus IV but highly prized because of its light weight. Light weight with adequate strength will be one of the big problems for Terran designers. Another is the question of impact strength and hydrogen embrittlement.

The possibilities of design for industry are tremendous but a great deal of study and investigation will have to be carried out before laying out a design program. Any plans that Terran firms may lay out for work in this field will have to be carefully studied by our Division and receive our approval before they can be carried out. This Division's approval should be obtained, of course, before any product or machine is sold on Arcturus IV. The industrial problem is so complex that it will be sometime before we will even consider requests for production in this field.

The product field, however, is quite different and the possibilities are limitless. The Division is prepared to review applications for design approval in this field immediately. A brief outline of some of the areas in which these products might be used are described below:

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Received
Mass. Intergalactic Traders
10 Aug. 2951

1.) Household Equipment.

Furniture of all types, designed to fit the dimensions of the Methanians could be readily sold. The use of wood in their construction would prove to be quite a novelty, but care must be exercised to keep the product light. Dust is not a problem on Arcturus IV but the removal of frozen water vapor, which keeps settling out of the atmosphere is a nuisance to the Methanian housewife. Vacuum cleaners are unknown, the old fashioned broom does the job now.

Electricity is used for lighting and cooking (and heating in the country) and all equipment in this field can be greatly improved upon, both from a functional and an aesthetic standpoint. The people have a well developed sense of beauty as evidenced by their high attainments in art and music. This love of beauty, however, has not yet been translated into the products they use.

2.) Equipment for Personal Use and Recreation.

Equipment in this area is very limited at this time, consisting primarily of balls of various types for simple group games and various types of cards for indoor games and for gambling purposes. Photography, radio, television (even the telephone) are unknown, but they can undoubtedly be gradually introduced to the profit of Terran companies. The people do attend a great many musical concerts and they frequent the legitimate theatre and gambling houses. One of the strangest sights we observed in our stay was a dance recital. What the Terranians consider to be a fast intricate dance step appears to us as the slowest of slow motions. On the other hand, one of our movies projected at 20 frames per second would be just a blurr of light to them with their very slow stimulus-response time.

3.) Industrial and Commercial Products.

Equipment that we would normally include in this category does not exist on Arcturus IV (typewriters, business machines, telephones, recording equipment, power tools, etc.) Their commercial equipment consists largely of hand tools. These can be redesigned, of course, but the blank spaces in the field should provide a greater challenge.

4.) Transportation.

This area is somewhat more advanced than we would at first suspect primarily because it is so vital that the Methanians conserve as much of their energy as possible. The power source for the scooter type vehicles used is battery supplied electricity. They operate at a very slow speed to prevent the operator or pedestrian from being hurt. Even the large transportation units operate at slow speed. It is suggested that some thought be given to the design of automatically controlled "busses" or "trains" for them so that the transportation system could be speeded up.

CONFIDENTIAL

CONFIDENTIAL REPORT

Massachusetts Intergalactic Traders, Inc.

From: J. Sapmill
Subject: Arcturus IV

To: R. Z. Hollenhead
File No. 3463

10 August 2951

CONFIDENTIAL

Under order No. OK2734 issued by the Chairman of the Board R. Z. Hollenhead on 17 May 2951 the writer proceeded to lay plans for a first-hand investigation of the conditions on Arcturus IV and to evaluate the trade possibilities with the intelligent life discovered there. Provision was made with the Commanding Officer of the Spica transport to make a side excursion on their regularly scheduled flight of 22 May 2951, arriving on Arcturus IV on 6 June 2951.

Comfortable accommodations were obtained in the new permanent Headquarters of the T.E.C.H. and the investigation started. A number of field trips were made but due to the high gravity and the extremely slow moving electro-scooters available for hire very little can be accomplished in any one trip. About six hours outside the degravitized headquarters building is about all the average human being can stand in any 24 hour period even with a Hi-G suit. This means that at present we were limited to an area within a six or seven mile radius of headquarters. The T.E.C.H., however, has on order some small two and four place space ships and when they arrive human travel will be greatly facilitated.

The writer offered his services to the Design and Production Division of T.E.C.H. and this was accepted by Jack Nold, Director of the Division. The writer feels that this cooperation was very beneficial to our company and speeded up the process of accumulating and recording data. The report of Mr. Nold (5 August 2951) although general gives a true picture of the state of Methanian culture.

One field of design that Mr. Nold did not touch upon and which strikes the writer as one of the more urgent problems of Arcturus IV is the equipping of the Methanian farmer so as to increase his productive capacity. His soil preparation methods are antiquated even for this "early 20th century" culture and his methods and equipment for harvesting are completely inadequate for the big job they have to do. It is the fierce opinion of this investigator that the small size and relative weakness of the Methanians is partly the result of the near starvation rations of many many generations.

Even if the farmer's methods of planting and harvesting were "modernized" with newly designed machines and tools, he is still faced with the terrible rodent problem and the losses they inflict in eating his crops. Design can ease this situation, too.

It is probably not wise to delay trade with these people until farming equipment can be designed and built, but a project under this classification should be started as soon as possible. Nothing else will do more towards cementing the friendship of the Methanians to the Terranians and especially our company than products of this type.

In the meantime, short range projects in the household and personal use fields should be carried out at a very handsome profit to our company.

In the name of the company, the writer has provisionally reserved office space and living quarters for 20 members of our staff in the Headquarters Building of T.E.C.H.

CONFIDENTIAL

INTER-OFFICE MEMO

Massachusetts Intergalactic Traders, Inc.

From: R. Z. Hollenhead To: Heads of All Departments
Subject: Arcturus IV File No. 3463

13 August 2951

Gentlemen:

You are requested to read carefully the enclosed reports of J. R. Nold (T.E.C.H. - 5 August 2951) and of J. Sapmill (M.I.T.₃ - 10 August 2951) on design and production opportunities on Arcturus IV. The complete file on this planet is available in my office for further study.

Kindly meet in the large conference room off my office at 10:00 on 16 August 2951 to plan a design production and sales program for this new territory. This is a very important meeting and may lead to the break that we have been looking for.

CC: A. Edward - Chief Designer
Shelton Maw - Production Manager
Shoven Leare - Chief Engineer
Lean Dent - Sales Manager
J. Sapmill - Assoc. Designer

COPY
CONFIDENTIAL

CONFIDENTIAL REPORT

Massachusetts Intergalactic Traders, Inc.

From: R. Z. Hollenhead To: Department Heads
Subject: Conference of 16 August File No. 3463

18 August 2951

The meeting of Department Heads was called to order by the Chairman of the Board, Mr. R. Z. Hollenhead at 10:05, 16 August 2951. R. Z. reviewed the Arcturus File from the time first contact was made on 22 January 2951 to the present. He then called on Dr. J. H. Rones, Director of "Project Arcturus" for the Terran Exporting Counsel Headquarters. Dr. Rones gave a lengthy account of this government agency's work to date. He emphasized the need of the Methanians for design and production help and showed how that help can be extremely profitable to any Terranian Company. He also mentioned (but would not divulge names) that a number of other Terran Trading companies were planning projects for Arcturus IV.

R. Z. then spoke of the urgency of the situation if our company was to maintain its leadership in the Intergalactic Trading business. It was decided by unanimous vote that all divisions work overtime until the first design was built and in the hands of the Sales Department. All Department Heads pledge their utmost cooperation to this end.

It was decided that the Design Department prepare a number of different designs in the household and personal use field to submit to this gathering at our next meeting.

J. Sapmill then reported on his trip to Arcturus IV and spoke eloquently of the dire need of the Methanian farmers. It was decided that a number of specific long range programs be instigated at this time. Sapmill was put in charge of "Project Hayseed" with instructions to form a study group and then a design group to see what can be done to increase the Arcturian production of food.

Other study and design groups were authorized and set up in the general field of electronics and communication, photography and general entertainment and in the field of high speed automatic transportation (30 to 40 miles per hour). Special meetings of the Department Heads will be called as soon as anyone of these long range groups has anything to report.

The group was reminded that the annual company picnic will be held on Labor Day, 2 Sept. as in the past. The location is not definite as yet but the committee thinks that it will be at Blue Hills.

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**massachusetts
intergalactic
traders, inc.**

INTERGALACTIC CODE NO. 76
ADDRESS MIT

78 massachusetts avenue - cambridge, massachusetts - terran

20 August 2951

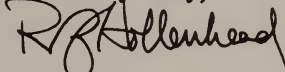
**OFFICE OF THE
BOARD CHAIRMAN**

**Mr. Arnold Edward
Chief Designer**

Dear Arnold:

This letter is your formal authorization to proceed at once on design work for Arcturus IV. This will be known as "Project Dishpan" and expense should be charged to order No OK 2735. As you recall from our Department Heads Meeting your group is to prepare a number of Designs in the general fields of Household Products or Personal Use Products. All engineering details should be carefully worked out. S. Leare, Chief Engineer, assures me that his group will cooperate with you in every way to expedite the work.

Yours very truly,



**R. Z. Hollenhead
Chairman of the Board**

C O P Y

CONFIDENTIAL

INTER-OFFICE MEMO

Massachusetts Intergalactic Traders, Inc.

From: R. Z. Hollenhead To: Heads of All Departments
Subject: Arcturus IV File No. 3463

24 August 2951

Gentlemen:

The following step has been taken to facilitate the flow of necessary information between Earth and Arcturus IV for the development of project "Dishpan"

A special information division has been set up on Arcturus IV by T.E.C.H. All inquiries may be made directly to:

Mr. Will Tehlum
Assistant Director of Information
T.E.C.H. Spaceport 17321
Snafus, Arcturus IV

All department heads are hereby authorized to use this new communication channel as they see fit. The project will be further expedited if one copy of all incoming data is placed in a master file to be located in the M.I.T. engineering library.

CC: A. Edward - Chief Designer
Shelton Maw - Production Manager
Shoven Leare - Chief Engineer
Lean Dent - Sales Manager
J. Sapmill - Assoc. Designer

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massachusetts
intergalactic
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INTERGALACTIC CODE NO. 78
ADDRESS ONLY

78 massachusetts avenue - cambridge, massachusetts - terran

3 October 2951

OFFICE OF THE
CHIEF DESIGNER

Mr. Will Tellum
Assistant Director of Information
T.E.C.H. Spaceport 17321
Snafus, Arcturus IV

CONFIDENTIAL

Dear Mr. Tellum:

It was a pleasure to hear that T.E.C.H. had set up a special department to expedite communications between Terra and Arcturus IV. I am afraid I'll be bothering you quite a bit in the near future, since our job will require extensive detail information. Incidentally, if I can ever help you in any way, just let me know. I'll be glad to do it.

As you probably know, we are embarking on a program to develop household and personal use products for the Methanians. Therefore, the nature of our first request shouldn't surprise you. One of my designers is investigating the possibility of producing on electric clocks for the Methanians.

He has prepared a list of questions which are on the attached sheet. I would greatly appreciate it, if you could supply answers to any or all of them.

Thank you for your consideration, and I hope to hear from you soon.

Yours very truly,

/s/

Arnold Edward
Chief Designer

COPY
Enc.

QUESTION SHEET

- 1.) What is the exact length of the day in Terran hours?
 - * 2.) Is the day subdivided in time units?
 - * 3.) Is there any system or device in use to tell the time of day?
 - * 4.) What number system is used?
 - 5.) What is the method of reading the written language? Is it read from right to left, up, or down, etc? What are the symbols for the time units, if any?
 - 6.) Is alternating current generated? If so, what frequency? What is the standard house voltage? What type of connection is used to connect appliances, if any? (Analogous to our wall plugs and sockets.)
 - 7.) What kind of faces, dials, scales, etc. appear on any instruments in use? If circular dials are used, are they read clockwise, or counter clockwise?
- * Please describe, if possible.

Terran Exporting Counsel Headquarters

Spaceport 17321

Snafu

Arcturus IV

Office of General Information

25 October 2951

Mr. Arnold Edward, Chief Designer
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Massachusetts

Dear Mr. Arnold:

You will find enclosed, a report which contains the answers to the questions you sent with your letter of October 3. I am happy to state that we have been able to collect data on all the questions. I hope that you will find the report complete and satisfactory.

It is our intention to supply all needed information as quickly and as accurately as possible, so do not hesitate to make further requests. We will be glad to serve you.

Very truly yours,

/s/

Will Tellum
Assistant Director of Information

Received
Mass. Intergalactic Traders
18 Nov. 2951

CONFIDENTIAL

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE _____

FROM Arcturus IV

TO Terra

SUBJECT T.E.C.H. Information Report #1

FILE NO. Spaceport 17321

1) Length of Methanian Day:

The day is $159.16 \pm .01$ Terran hours long. (This was determined by the Condenserchron method.)

2) Subdivision of Methanian Day:

The day is divided into 6 GAHLOS. Each GAHLO is divided into 6 BAHLOS. Each BAHLO is divided into 36 NAHLOS. Therefore, 1 day = 6 GAHLOS = 36 BAHLOS = 1296 NAHLOS. The NAHLO is equal to $159.16/1296$ hour, or 0.1228 hour, = 7.37 minutes. The NAHLO corresponds roughly to our minute. The average Methanian does not seem to be troubled by the lack of a precise time unit. However, for scientific work, the MAHLO has been further subdivided into 36 SAHLOS.

Mass. Intergalactic Traders
10 Nov. 2951

3) Methanian Time Recording Systems:

The manner in which the Methanians designate the time of day, is to recite three numbers in sequence. Thus 2-3-25 would mean that it is the 25th NAHLO of the 3rd BAHLO of the 2nd GAHLO. For reasons mentioned below, it is generally understood that the NAHLO figure is approximate. Their method is equivalent to our custom of saying 2:15 to designate 15 minutes after 2:0'clock. Their system is used throughout the planet. The most important method of time keeping in operation at present consists of audio signals, (bells or whistles), which are sounded at the beginning of each BAHLO. For instance, two blasts followed by three, indicates the 3rd BAHLO of the 2nd GAHLO. The signals are regulated by accurate time keeping devices in local observatories, and are transmitted electrically. Prior to the introduction of electricity, time was recorded by the Arcturan sun dial. Thus, it was a commodity possessed only by the few. However, time signal devices are as common on Arcturus IV, as street lights are in North America.

From our point of view, the Methanian ability to do without a more precise measure of time of day is amazing, considering the level of their culture. As nearly as can be determined, they seem to possess a "feeling" for the approximate time in NAHLOS, during any one BAHLO. This is probably due to the fact that they are subjected periodically to the time signals. The signals are inoperative in large areas during most of the night. There has been no attempt to produce time keeping devices for individual Methanians. Devices, (which we would call machines), have been built, which use the pendulum principle and are installed in observatories, laboratories, and factories or other large buildings having a direct need for more accurate time keeping methods. The concept of small, neat, light, timekeeping devices is unheard of here, at present.

4) Methanian Number System:

The number system is based upon six(6), as would be suspected upon considering Methanian three digit hands. The number system definitely evolved from finger counting. Thus, 1,2, and 3 are I,V, and V. An alternate symbol

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE _____

FROM _____

TO _____

SUBJECT T.E.C.H Information Report #1

FILE NO. _____

- 2 -

for three was the closed fist, which gradually deteriorated into a small circle. (as a symbol) Thus, four would be one finger and one fist, or ol. This gradually became ol. Similarly, five is V. Six would be two fists. This ultimately became two circles, one on top of the other, or 8. This is, of course, our figure "eight", exactly. The idea of building up larger numbers by arranging symbols in sequence, and allowing the position of the symbol to indicate its value, (as we do in Arabic notation), was introduced about 85 Methanian years ago. The complete history of the development of the number system is interesting, but only the final result is given here:

	1	1	7	11	13	V1	19	V1	25	d1	31	d/1	
	2	V	8	IV	14	VV	20	VV	26	dV	32	d/V	
0=8	3	V	9	IV	15	VV	21	VV	27	dV	33	d/V	etc.
	4	d	10	14	16	Vd	22	Vd	28	d d	34	d/d	
	5	d/	11	1d/	17	Vd/	23	Vd/	29	d d/	35	d/d/	
	6	18	12	V8	18	V8	24	d8	30	d/8	36	188	

5) Methanian Written Language:

The language is based on symbolic notation and consists of 19 symbols representing consonant and vowel sounds. It resembles early 20th century Terran shorthand. The writing is read from left to right. Sentences are written horizontally starting at the top of the page with subsequent sentences proceeding downward. A Methanian book is almost identical to a Terran book as far as the mechanics of reading are concerned. The symbols for the Methan time units are:--

GAHLO - 7 7d-
BAHLO - 7 7d-
NAHLO - 7 7d-
SAHLO - 6 7d-

CONFIDENTIAL

6) Generation of Electric Current:

Alternating current is generated. The frequency of the current is 1296 cycles per NAHLO. (Note that $1296 \times 6 = 18888$ in Methanian notation. This is analogous to 10000 in Terran notation). Since $1 \text{ NAHLO} = 7.37 \text{ min} = 442.5 \text{ sec}$, then $1296 / 442.5 \text{ sec} = 2.926 \text{ cps}$ (This is about 1/20 of standard Terran frequency of 60 cps).

The Methanian electrical science is, of course based upon the concepts of emf, current, and resistance. Their unit of emf is called the GINT which is equivalent to $2.378 \pm .001$ volts. Electrical transmission over great distances is accomplished with an emf of 1296 GINTS = 3080 volts. Individual house voltage is stepped down to 1.36 of this = 85.6 volts. This standard emf of 36 GINTS seems to be available in almost every Methanian structure which uses electricity.

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

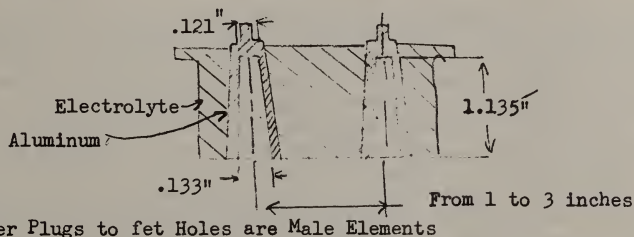
DATE _____

FROM _____ TO _____

SUBJECT T.E.C.H. Information Report #1 FILE NO. _____

- 3 -

The typical electrical connector for portable appliances consists of a female element which has two cylindrical tapered holes. This is placed on the walls of a room, generally projecting out of the wall about 1 1/2 inches. The male elements are two separate tapered plugs fastened to the wire ends. The accompanying sketch gives the necessary dimensions.



7) Methanian Instrument Scales:

Many standard Terran type instrument scales are known. The circular dial is commonly used, and numbers increase in magnitude in a clockwise direction. Numbers are placed to mark the space between graduations, rather than the graduation. This is always true when the divisions are large. The production of instruments is increasing with the advancing Methanian technology.

CONFIDENTIAL

CONFIDENTIAL REPORT

Massachusetts Intergalactic Traders, Inc.

From: R. Z. Hollenbach

To: Arnold Edwards

Subject: Methanian Clock

File No. Z

The first step in the design of a Methanian clock was to obtain added special information. The correspondence undertaken to secure the extra data appears in the appendix of this report. A study of the new information revealed:

- 1.) A Methanian clock could be electrically driven
- 2.) The Methanians are used to thinking of time in terms of three separate numbers.
- 3.) A small timepiece with an instrument face would be completely new to their culture.

Item 1.) The generated alternating current of the Methanians is sufficiently accurate in frequency to rotate a small synchronous motor unit at the constant speed required. The work of converting between Methan and Terran units was sidestepped by using the Methan frequency unit exclusively. This was possible, since the shaft speed of a synchronous unit is directly proportional to the applied frequency. The given Methan frequency is 1296 cycles per NAHLO, and there are 1296 NAHLOS per day. This indicated that a large gear reduction would be necessary somewhere in the clock. The possibility of reducing the shaft speed electrically was investigated. Consultation with Gerald Fitz, M.I.T.'s famous electrical designer, brought out the point that electrical reduction of speed is attendant with increase of unit size. It was decided to have a synchronome designed which would give a shaft speed of 1/6 the impressed frequency. This would still be small and light enough to serve the purpose, and also have sufficient torque to drive the clock mechanism. A sketch of the "Fitz" synchronome with necessary additions is given on page 3.

Item 2.) The Methan manner of telling time immediately suggested a clock face with three numbers which would change periodically. The mechanism would be of a counter type. The idea was investigated, but the resulting mechanism proved to be too heavy, and complicated to be practical.

The idea of a dial face clock was then considered. It was decided to have three separate dials, each showing a separate time unity. Two of the dials, are identical. It was felt that the idea of a single dial with two hands to take their place would not do for an initial mode. (This could be introduced later as a "new" improvement.)

Since the drive shaft of the synchronome is 216 rev./NAHLO, and the day is broken into units of 6 and powers of 6, a compact gear reduction unit was designed using eight identical 6-1 reducer gears. The clock hand shafts and drive shafts are conveniently geared into the reduction unit. (The complete gear box is shown on Drawing No.M-31, and a schematic of the clock drive is shown on Drawing No.5-82.)

The position of the dial faces was next considered. The obvious choice would be to place them in line, to be read off as the Methanians recite their time numbers. However, the NAHLO dial was necessarily the largest. Therefore, considerations of symmetry indicated that it should be the central dial. After some experiment, the arrangement used was decided upon. This also had the advantage of simplifying the connections to the gear reduction unit.

CONFIDENTIAL REPORT

Massachusetts Intergalactic Traders, Inc.

From: R. Z. Hollenbach

To: Arnold Edwards

Subject: Methanian Clock (Cont'd)

File No. _____

Item 3.)

The newness of a small dial clock in Methanian culture sets up the requirement that its function must be visually evident. Therefore, each dial face is clearly marked with the symbol for its time unit. All dials are adequately numbered. The clock is made in bright contrasting colors, with the definite purpose of attracting immediate attention. This policy may be modified when the Methanians become used to the idea of a dial clock.

Note: For more complete engineering data, see Drawing No. A-30 (This is the assembly of the unit.)

CONFIDENTIAL

BY R.Z.H. DATE _____
CHKD. BY _____ DATE _____

SUBJECT SYNCHRONOME
ASSEMBLY
DRAWING NO. E-48

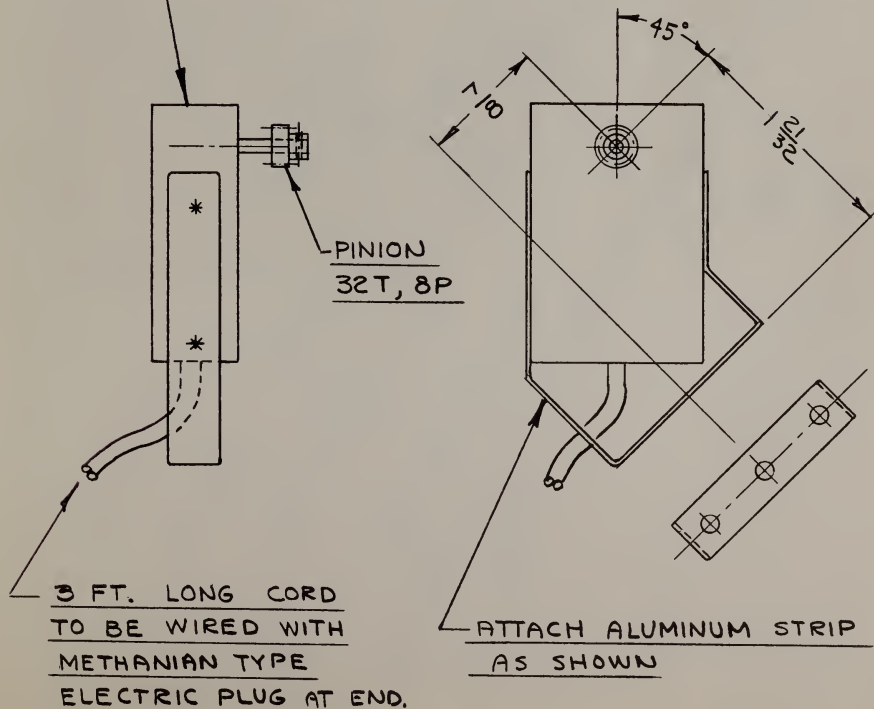
SHEET NO. 1 OF 1 ³
JOB NO. _____

SYNCHRONOME :

WEIGHT = 3.4 OUNCES

SHAFT TORQUE = 2.4 INCH POUNDS MAX.
AT INPUT OF 86 VOLTS

SHAFT SPEED = INPUT FREQUENCY $\times \frac{1}{6}$



DIVISION OF METHANIAN DAY:- (1 DAY = 159.16 TERRAN HOURS)

1 DAY = 6 GAHLOS = 36 BAHLOS = 1296 NAHLOS

1 GAHLO = 6 BAHLOS = 216 NAHLOS

1 BAHLO = 36 NAHLOS

NOTE: NUMERICAL NOTATION IS TERRAN

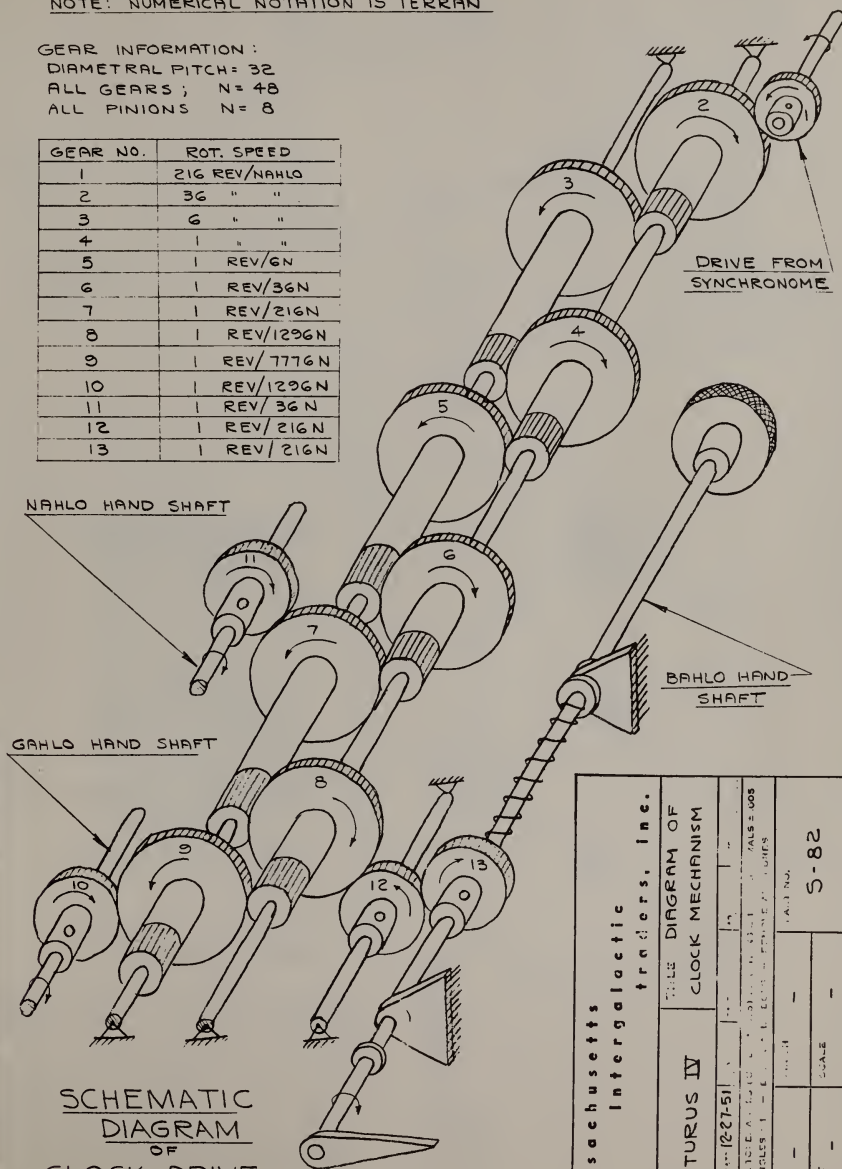
GEAR INFORMATION:

DIAMETRAL PITCH = 32

ALL GEARS; N = 48

ALL PINIONS N = 8

GEAR NO.	ROT. SPEED
1	216 REV/NAHLO
2	36 " "
3	6 " "
4	1 " "
5	1 REV/6N
6	1 REV/36N
7	1 REV/216N
8	1 REV/1296N
9	1 REV/7776N
10	1 REV/1296N
11	1 REV/36N
12	1 REV/216N
13	1 REV/216N

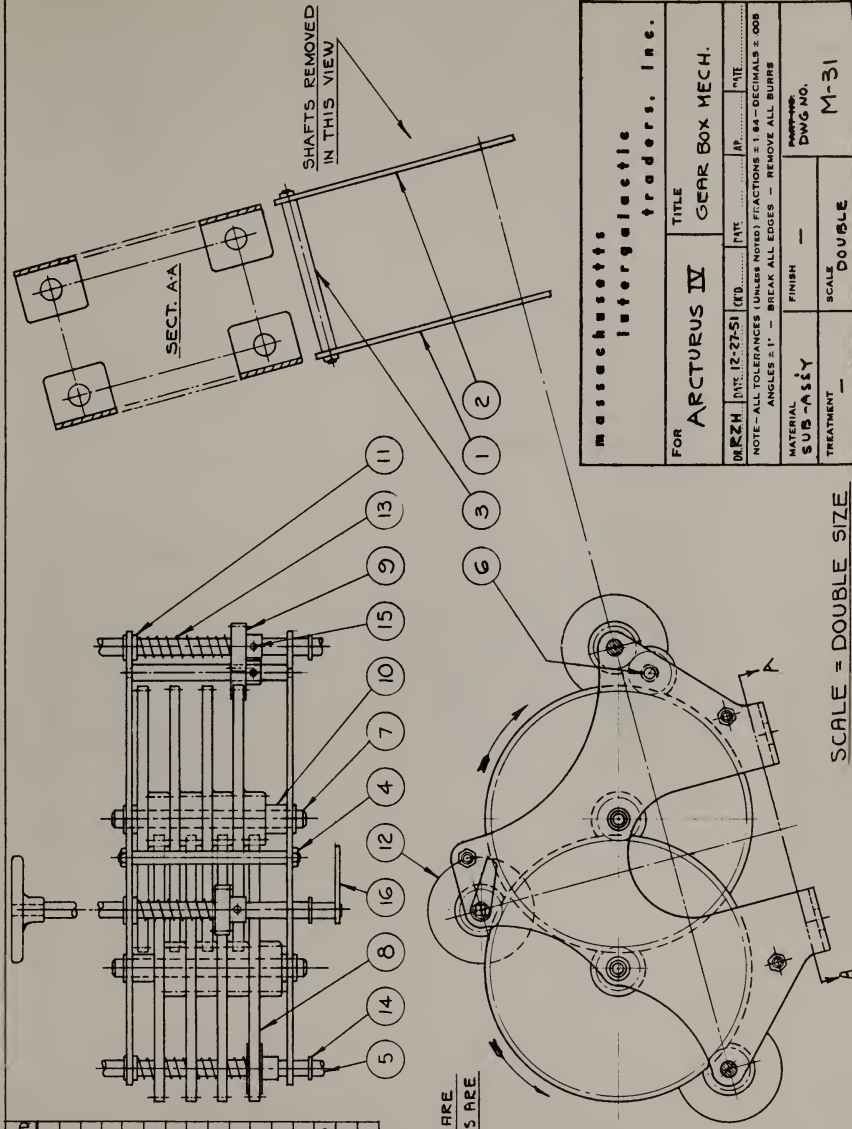


SCHEMATIC
DIAGRAM
OF
CLOCK DRIVE

massachusetts Intergalactic traders, inc.		TITLE DIAGRAM OF CLOCK MECHANISM	
FOR	ARCTURUS IV	DATE	12-27-51
DRAWN BY		CHECKED BY	
MATERIAL		SCALE	
TREATMENT		SCALE	
S-82		S-82	

NO	DESCRIPTION	QTY
1	FRONT BRACKET	1
2	REAR BRACKET	1
3	STUD	3
4	NUT	6
5	CLOCK HAND SHAFT	3
6	IDLER SHAFT	1
7	REDUCER GEAR SHAFT	2
8	REDUCER GEAR	6
9	PIUNION GEAR	4
10	SPACER	2
11	SPACER	5
12	HAND KNOB	3
13	SPRING	3
14	SNAP RING	10
15	TAPER PIN	3
16	CLOCK HAND	3

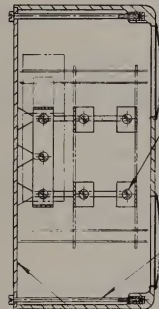
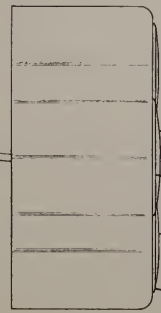
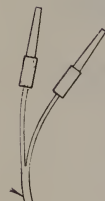
GEARS AND PLATES ARE
MAGNESIUM
ALUMINUM



Massachusetts
Intergalactic
Traders, Inc.

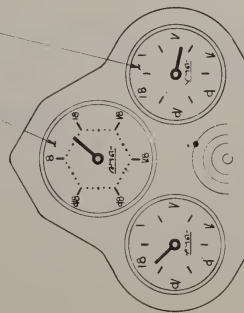
FOR		TITLE	
ARCTURUS IV		GEAR BOX MECH.	
DATE	REV	DATE	REV
12-27-51	1		
NOTE - ALL TOLERANCES (UNLESS NOTED) FRACTIONS $\pm 1/64$ - DECIMALS $\pm .005$			
ANGLES $\pm 1^\circ$ - BREAK ALL EDGES - REMOVE ALL BURRS			
MATERIAL		FINISH	
SUB-ASSY		--	
TREATMENT		SCALE	
--		DOUBLE	
		DWG NO.	
		M-31	

— ALUMINUM WIRE
— SILICONE RUBBER INSULATION

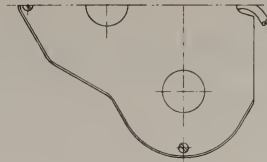
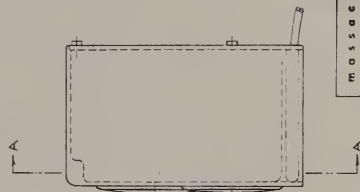


SECTION B-B

1 2 3 4 5 6 7



SECTION A-A



NO.	DESCRIPTION	REQD.	MATL.	REMARKS
1	COVER	1	PLASTIC POLYSTYRENE	
2	BACK PLATE	1	PLASTIC POLYSTYRENE	
3	SCREW	3	MAGNES	
4	GEAR ASSEMBLY	1	SEE DR. M-31	
5	SYNCHRONOME	1	SEE DR. E-48	
6	SCREW	7	MAGNES	
7	NUT	7	"	
8	WASHER	7	"	
9	SMALL BEZEL	2	PLASTIC POLYSTYRENE	
10	SMALL CRYSTAL	2	MAGNES	
11	SMALL DIAL	1	RUM.	
12	LARGE BEZEL	1	PLASTIC POLYSTYRENE	
13	LARGE CRYSTAL	1	MAGNES	
14	LARGE DIAL	1	MAGNES	

massachusetts
intergalactic
orders, inc.

FOR		TITLE	
ARCTURUS IV		CLOCK ASSY	
DRGN	12-28-51	DATE	12-28-51
MADE IN U.S.A. BY MASS. INTERGALACTIC ORDERS, INC.			
ASSEMBLY		PART NO.	
1		R-30	
FULL SIZE		1/2" = 1"	

massachusetts
intergalactic
traders, inc.

INTERGALACTIC CODE NO. 76
ADDRESS MIT:

78 massachusetts avenue - cambridge, massachusetts - terran

OFFICE OF THE
CHIEF DESIGNER

26 December, 2951

Mr. J. S. Wick
Terran Exporting Counsel Headquarters
Arcturus Division
Methane 90, Arcturus IV

Dear Sir:

We have been confronted with a few problems dealing with Methane psychology in our design project here.

One of our top designers, Mr. Reenidrag, has come up with the idea which I think has merit, but I feel I should have more confirmation on its acceptability before I authorize additional work.

He has prepared rough sketches of a baby stroller or cart, with a provision for using it as a portable incubator before the youngster is hatched from the egg. He suggests a very lightweight construction that could easily be shipped in package form and assembled there.

Do you have information at present on the possibility of the mechanical hatching of the egg being acceptable in Methanian culture.

Any help or suggestions would be greatly appreciated. Thanks again for making my first visit to Arcturus so enjoyable. Give my best regards to all the fellows and Happy New Year!

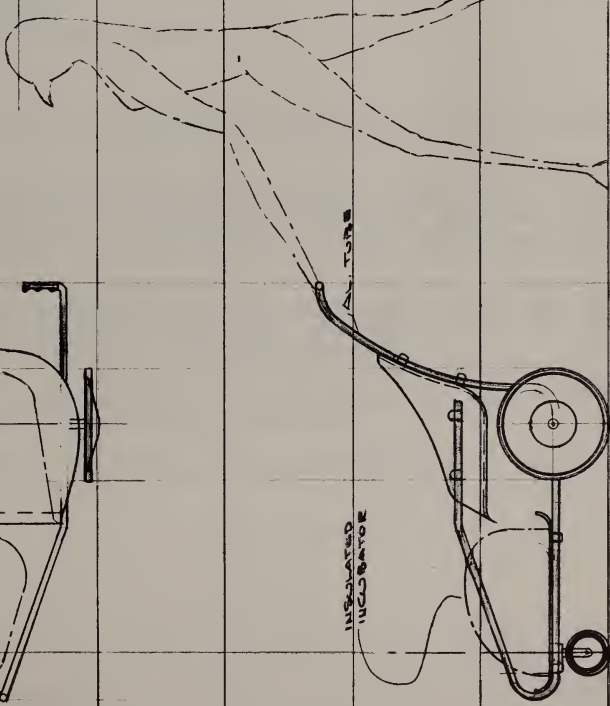
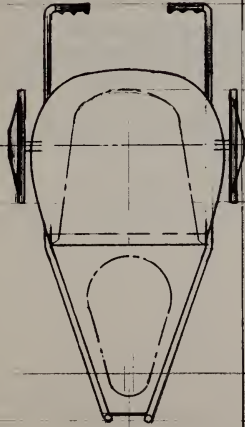
Very truly yours,

/s/

J. Sapmll

JS:am

CONFIDENTIAL



MADE BY
 JAMES M. LEE
 1000 1/2 ST. N. W.
 WASHINGTON, D. C.

MASSACHUSETTS INTERGALACTIC TRADERS, INC.	
FOR ARCINUS IV	TITLE CASE RIGGE - INCUBATOR
DATE 12-24-51	DATE 1/1
NOTE - ALL TOLERANCES (UNLESS NOTED) FRACTIONS $\pm 1/64$ - DECIMALS $\pm .008$ ANGLES $\pm 1^\circ$ - BREAK ALL EDGES - REMOVE ALL BURRS	
MATERIAL FINISH	PART NO.
NOTED	SCALE 1 1/2" = 1'-0"
TREATMENT	

JOB # 7951

TERRAN

EXPORTING

COUNSEL

INTERGALACTIC CODE NO. 18
ADDRESS TECH

HEADQUARTERS

Hexagon Building - 187 Level - Washington 99 - Terran

PSYCHOLOGY & PHYSIOLOGY DIV.
J. S. WICK, DIRECTOR

13 January, 2952

Mr. J. Sapmill
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge 29, Massachusetts, Terran

Dear Mr. Sapmill:

In reference to your letter of December 26, I am afraid I have bad news for you.

Our committee compiling data on Methanian psychology consulted one of our Methanian consultants, a Professor Bsptflik, who seems to be quite an authority on history of Methanian culture and well informed on current trends and opinions.

His decision was favorable on a baby stroller but was very much against a mechanical incubator. He believes this might come in several generations, but it would be a slow evolutionary process.

Another factor against such a design is the fact that the young learn to walk or move about in a very short time.

I am sorry I can't give you more favorable reports. Maybe we will have better luck next time.

Very truly yours,

/s/

J. S. Wick

Received
Mass. Intergalactic Traders
18 Jan. 2952

CONFIDENTIAL

massachusetts
intergalactic
traders, inc.

INTERGALACTIC CODE NO. 76
ADDRESS MITI

78 massachusetts avenue - cambridge, massachusetts - terran

OFFICE OF THE
CHIEF DESIGNER

14 February, 2952

Mr. J. S. Wick
Terran Exporting Counsel Headquarters
Arcturus Division
Methane 90, Arcturus IV

CONFIDENTIAL

Dear Mr. Wick:

We are in need of further physiological data on the Methanians.
We have a design project underway on a small stereoscope.

Some of the questions which have arisen are:

1. What are the general dimensions of the head? (Especially the eye, nose, forehead region).
2. What is the average lateral spacing of the eyes?
How much does the spacing vary?
3. What sort of line of vision do the general purpose eyes have?
4. Is focus adjustable as in the human eye?
5. Does the X-Ray eye function constantly?
6. What is general bone structure shape around the eye? (In reference to design of an eye piece).

We think pictures of various scene and people on Terran would be a good seller. I believe this product would help promote good will between the planets.

I would appreciate any data which you may have that would help in the development of this design project.

Very truly yours,

/s/

J. Sapmill

JS:am

TERRAN

EXPORTING

COUNSEL

HEADQUARTERS

INTERGALACTIC CODE NO. 19
ADDRESS TECH

Hexagon Building - 187 Level - Washington 99 - Terran

PSYCHOLOGY & PHYSIOLOGY DIV.
J. S. WICK, DIRECTOR

1 March 2952

Mr. J. Sapmill
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge 39, Massachusetts, Terran

Dear Sap:

Our physiological committee has rounded up the information you need. The consensus of opinion is that you hit the jackpot on this project. I believe it would have a terrific sales appeal due to the fact that we are constantly quizzed as to what earth looks like, what do our homes look like, etc. There is no present viewing apparatus like this in Methane to the best of my knowledge.

I am enclosing a grid sketch which was taken from Methanian government statistics bureau files.

I will outline answers to your questions.

- (1) Dimensions of head. (See grid sketch)
- (2) Eye spacing (Transposed to our scales) 3.00 Ins.
Varies very little (extreme cases $\pm .1$ Ins.)
- (3) & (4) Line of vision and angle of vision and ability to focus is practically same as that of human.
- (5) X-Ray Eye is an amazing feature. They have the ability to use it at will. It is controlled from conscious portions of brain and may be "turned off or on as they desire". It has a protective lid to prevent injury from dust particles, etc.
- (6) As for bone structure surrounding the eye, refer to my free hand sketch. The eyes are deeply inset in a small opening. The area around this opening is represented by contour line in the drawing.

I hope this information is satisfactory. We will delve into it deeper if necessary.

Very truly yours,

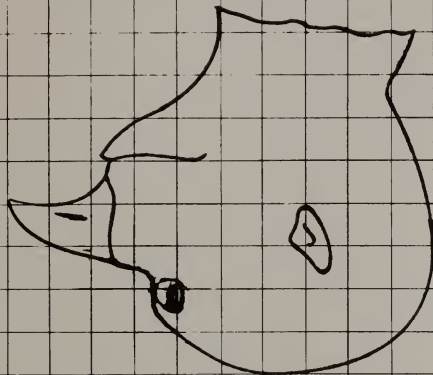
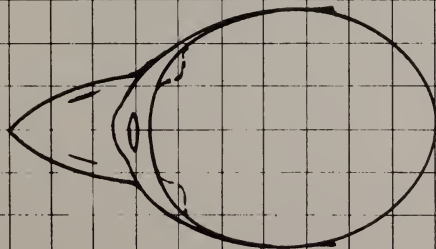
/s/

J. S. Wick

JSW:pm

Received
Mass. Intergalactic Traders
8 Mar. 2952

CONFIDENTIAL



RELEASE
ALL INFORMATION CONTAINED
HEREIN IS UNCLASSIFIED
DATE 12-28-2001 BY 60322 UCBAW

2

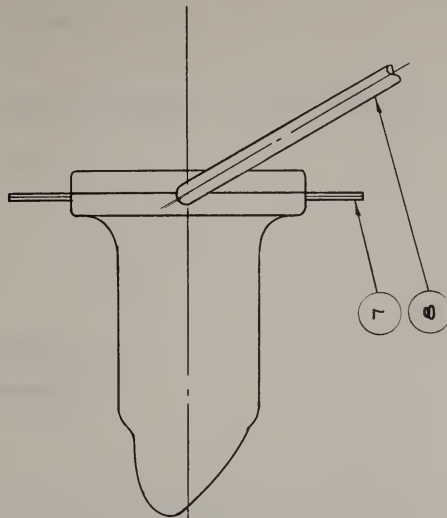
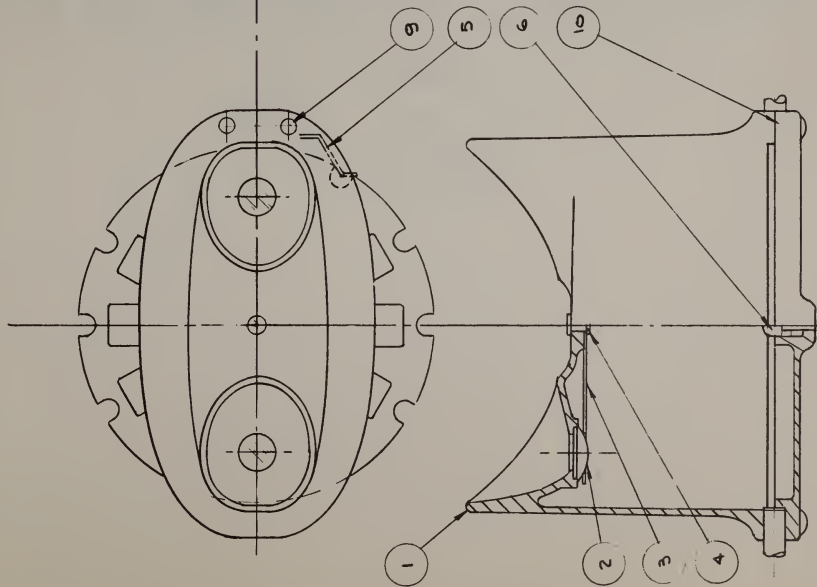
2424 E. 17th St.

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METHANE STAT BUREAU
FILE NO. 6

1

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DET NO	MAT'L	Massachusetts Intergalactic Traders, Inc.	
110	POLYETHYLENE (GENT)	FOR	TITLE
35	SH. ALUM	ARCTURUS IV	STEREOSCOPE
49	AL ZINCH		VIEWER
7	(TRANS) POLY STYRENE	DATE 1-15-52 (X'D)	DATE 1-15-52
8	AL. TUBING	NOTE - ALL TOLERANCES (UNLESS NOTED) FRACTIONS ± 1/64 - DECIMALS ± .005 ANGLES ± 1° - BREAK ALL EDGES - REMOVE ALL BURRS	
		MATERIAL FINISH	PART NO.
		TREATMENT NOTED	A-1
		SCALE FULL	

massachusetts
intergalactic
traders, inc.

INTERGALACTIC CODE NO. 76
ADDRESS MIT:

78 massachusetts avenue - cambridge, massachusetts - terran

22 August 2951

OFFICE OF THE
CHIEF DESIGNER

Bayard Gardineer
b-g Design Associates
500 Park Avenue
New York, New York

CONFIDENTIAL

Dear Bayard:

After persuading the company to retain your organization on a consulting basis I've finally found some use for you. We've been paying your damn fat fee for two months while you sat back and laughed. Well boy, here's your chance. You'll find the file on Arcturus 4 enclosed. Project "dishpan" is well under way within our own organization but as I said we decided to get something for our money.

Your job is to design a unit that combines a food mixer, a knife sharpener, a coffee grinder and a fruit juicer. How you do it is your worry. I decided to give this phase to you after seeing your new "Square Spray Sprinkler" design. Much as I hate to admit it, I thought it was the finest job of its kind I've seen. Good luck, son, I think you'll need it.

Best regards,

/s/

Arnold Edward
Chief Designer

COPY

1871-1872
 1872-1873
 1873-1874
 1874-1875

1875-1876

1876-1877

1877-1878

1878-1879

1879-1880

1880-1881

1881-1882

— b g — DESIGN ASSOCIATES

24 August 1951

Arnold Edward, Chief Designer
Massachusetts Inter-galactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Massachusetts

Dear Arnold,

You Sucker!

Why the hell didn't you ask me to make it a rocket ship as well? Okay, "big wheel" I'll show you. Believe it or not I can do just what you want, and it'll sell too. (I hope)

Nothing else to report, I just wanted to acknowledge your assignment and inform you that you have placed your trust in the best possible hands.

Give my love to Mom and the kids. You know sometimes I miss the old days in your design department; that is, I miss the old cronies, (notice the "s") you and Daffy and the rest of the boys. However, I don't miss the shiny pants and the cheese sandwich lunches....I eat three times a day now, Imagine! A real old-fashioned capitalist.

Cordially,

Byard Gardineer
Byard Gardineer
President

— b g — DESIGN ASSOCIATES

10 September 2951

Arnold Edward, Chief Designer
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Massachusetts

Dear Arnold,

I am sending you, under separate cover, my design for the mixer you asked for. Also included are thumbnail sketches of the juicer and sharpener attachments that are in the process of design. I must apologize for not having completed them also but complications have arisen.

As you probably know I am under contract to Cum, Lative and Co. and have done a great deal of work for them. To make a long story short, Fi (you remember him, Fi Nalexam, president of the company) called me up on urgent business for immediate delivery. Consequently I have had to suspend work on "dishman" temporarily but have no fear, I'll make it in a month or so. I trust this is satisfactory since you can begin manufacture of the base and mixer immediately. That ought to keep you busy for a while.

Once again, my love to Lana ,the kids and all the boys in the "perspiration pen".

Best Regards,

Byard Gardiner
Byard Gardiner
President

CONFIDENTIAL

Re. Food Mixer
for Massachusetts Intergalactic Traders

The basic reason behind the design of the mixer and proposed attachments is the weight consideration. Since articles weigh approximately eleven times as much on Arcturus 4 as they do on Terran, this is an important phase of the problem. If the mixer were designed as Terran mixers are, with the motor in the overhead beam, I don't believe the average Arcturian housewife would be able to tip the beam backward. However, the beam must be tipped in order to free the beater blades from the mix. Therefore, I found myself confronted with the task of lightening the overhead beam in weight. This was accomplished by placing the motor in the base and using a flexible shaft to carry the torque to the blades. This design feature cuts down the moment necessary to tip the beam since only the weight of the hollow shell the beater blades and a few gears act. There is also the moment due to the spring constant of the flexible shaft but the combination of the two is nevertheless much easier to tip back than the conventional mixer.

Once this feature had been worked out I had to decide how to make the other attachments fit the basic mechanism. I decided against the idea of attaching the other devices to the power source by way of the mixer head and separated the motor unit from the mixer unit. This means that the Arcturians can set the base unit (which is relatively heavy) on a low kitchen cabinet and leave it there permanently. The attachments (food mixer, fruit juicer, coffee grinder, knife sharpener) can then be stored in the kitchen and placed upon the base as their various services are required. There is no handle on the beam because of the design shape of the beam, its form is such that the fingers can easily reach around it and tip it back.

The major parts of the mechanism are magnesium, die cast in most cases. The gears are of steel and the flexible shaft is of steel with a flexible magnesium cover. The bushings are of nylon which is resistant to the common organic solvents and is resistant to weak acids and bases. These bushings can be injection molded. One feature that is not immediately apparent is the safety feature incorporated in the hook-up between the base unit and the mixer attachment. If a slow moving Arcturian should chance to catch a finger in the beater blades this hook-up coupling will separate and the finger will get twisted but not chopped off. After the finger is extracted the couple will come together again and mixer will operate, this also saves strain on the motor. The reostat may be thought to be a crude one as compared with the usual circular one. However, I decided this would be easier for the Arcturian to operate with his slow reaction time.

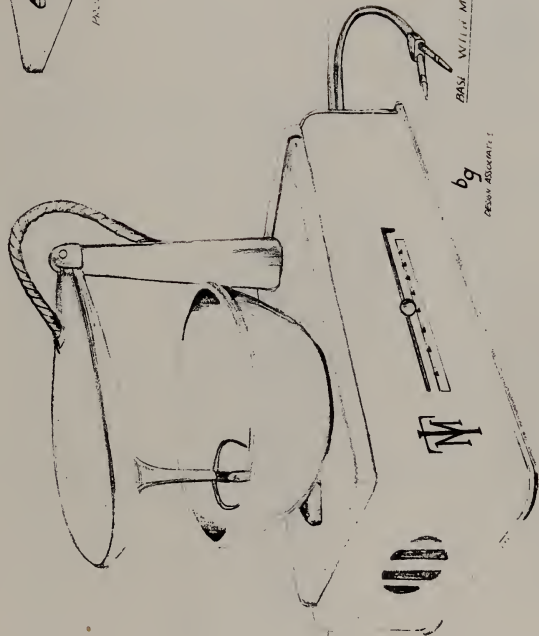
Bayard Gaultney



PROVED JUL 13 1953



PROVED JUL 13 1953



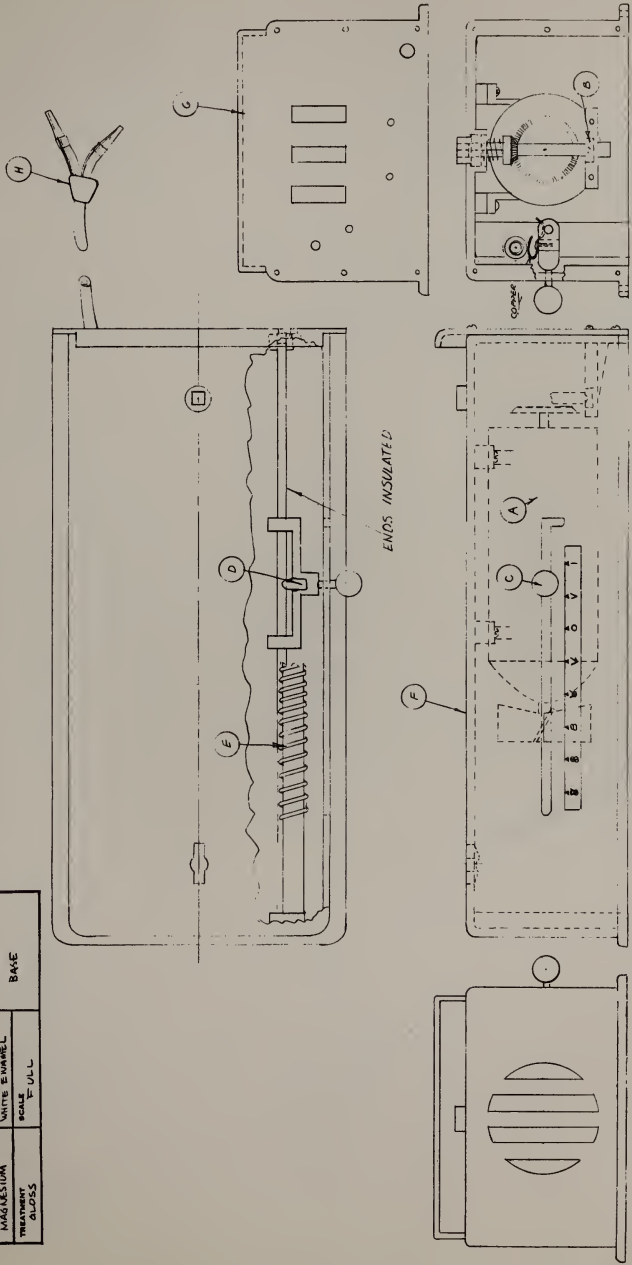
MUSEUMS		TITLE	
FOR METHANIA		FOOD MIXER, ATTACH, AND ALL PURPOSE BAS	
DE 10	INT 10/10/10	INT 10	INT 10
NOTE - ALL TOLERANCES (UNLESS NOTED) FRACTIONS ± 1/16" - DECIMALS ± .005			
NOTE - ALL DIMENSIONS ± .005" - DECIMALS ± .005"			
MATERIAL		FINISH	
MAGNESIUM		WHITE ENAMEL	
TREATMENT		SCALE	
GLOSS		FULL	
		PEN/ARTIST	

bayard garcinier, jr.

**Massachusetts
Intergalactic
Traders, Inc.**

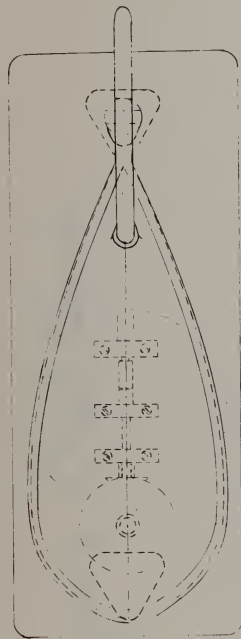
FOR	TITLE	
METHANIA	ALL PURPOSE BASE AND MOTOR UNIT	
QTY	QTY	QTY
1	1	1
DATE	DATE	DATE
1/1/55	1/1/55	1/1/55
NOTE - ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED - REMOVE ALL BURRS		
MATERIAL	FINISH	BASE
MAGNESIUM	WHITE ENAMEL	
TREATMENT	SCALE	
ALLOY	1" - 1/4"	

- A MOTOR
- B NYLON BUSHING
- C NYLON KNOB
- D NYLON RHEOSTAT RUNNER
- E RHEOSTAT
- F CASE - DIE CAST Mg
- G BACK - Mg
- H PLUG IN

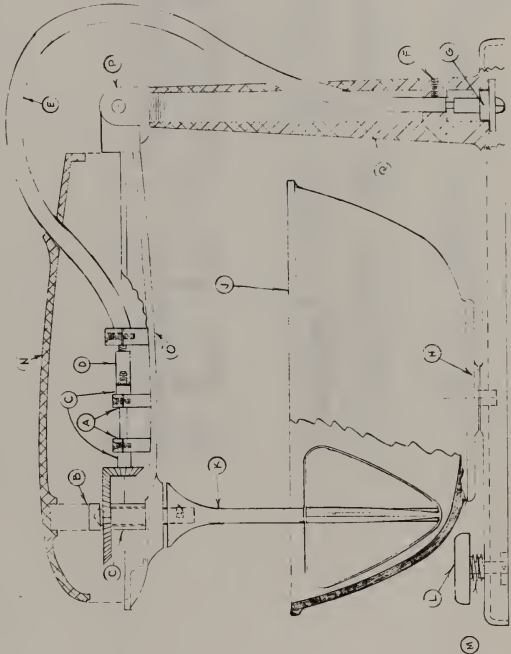
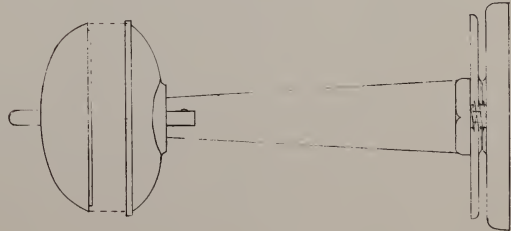


5
BY DESIGN 4/1/55

massachusetts Intergalactic traders, inc.									
FOR	METHANIA		TITLE		FOOD MIXER ATTACH				
BY	DATE	DESIGNED BY	DATE	BY	DATE	BY	DATE	BY	DATE
NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE TO BE MAINTAINED UNLESS OTHERWISE SPECIFIED.									
MATERIAL: NIKRESIUM									
FINISH: WHITE ENAMEL									
SCALE: 1/4" = 1"									
TREATMENT: GLOSS									
PART NO. 11111.1									



A	NYLON BUSHING
B	NYLON BUSHING
C	FLY WHEEL CORE FITTING, M3
D	FLY WHEEL SHAFT
E	SET SCREW
F	FLY WHEEL CORE FITTING, M3
G	MIXING BOWL
H	MIXING BOWL
I	MIXING BOWL
J	MIXING BOWL
K	MIXING BOWL
L	KEY WITH NYLON KNOB
M	SPRING
N	DIE CAST M3 COVER
O	DIE CAST M3 TOP ASSEMBLY
P	M3 HUBGE HALF
Q	DIE CAST M3 BASE ASSEMBLY



- (A) NYLON BUSHING (DOUBLE SIZE)
- (B) NYLON BUSHING (DOUBLE SIZE)
- (C) CORE FITTING

Designer's Sketchbook

Massachusetts Interplanetic Traders, Inc.
18 Mass. Ave., Cambridge, Mass. Terrain

Projected items for barter with
inhabitants of Creturus IV

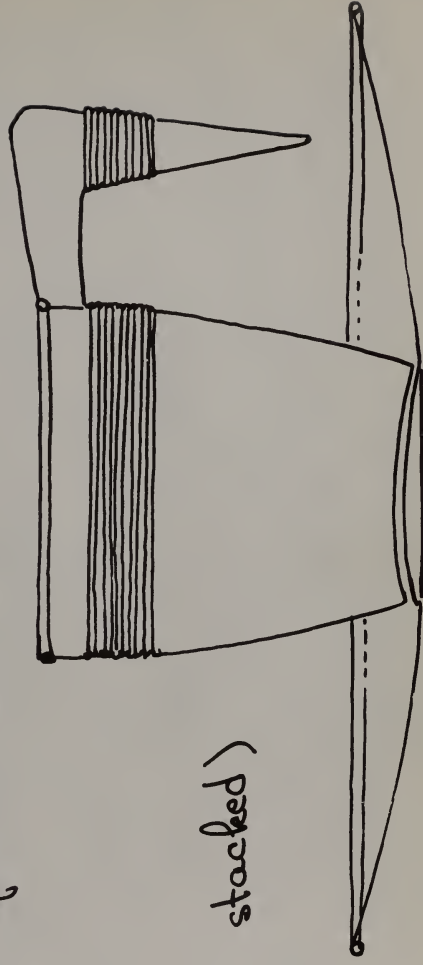
P. A. Menschitz, Design Department

Dinnerware : stamped or spun magnesium, with beaded edges. Silicone plastic handle on cup. Metal finished with colored oxides.

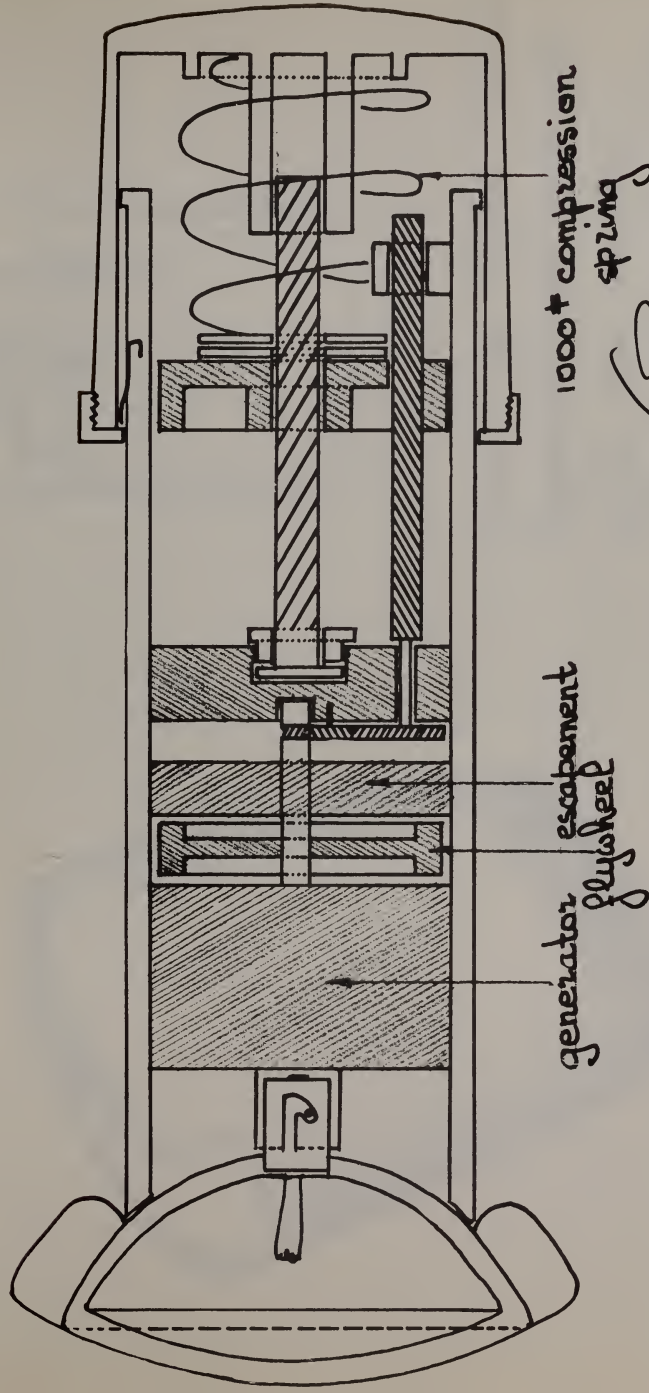


Stampings are all spherical sections

(Cups can be stacked)



all parts molded of silicone plastics

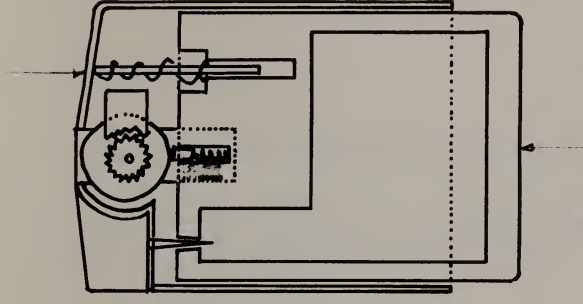


1000# compression
spring

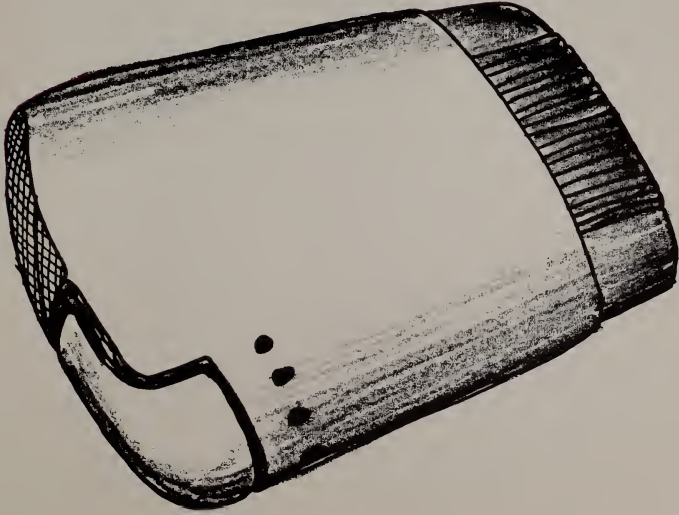
generator
flywheel
escapement

(REMARK: THIS
SPRING LOAD -
SOMETHING WROTE
HERE - JGA)

Generator flashlight
section, full scale



Ronson type lighter, stamped
magnesium outer case, with
spark wheel attached....
Throw-away oxygen tank
is of silicone plastic,
with flint attached.



INTER-OFFICE MEMO

Massachusetts Intergalactic Traders, Inc.

From: Furniture Design Division

To: Arnold Edward, Chief Designer

Subject: "Project Dishpan"

File No. 3463

10 December 2951

In reference to Mr. Hollenhead's letter dated 20 August 2951, this section is considering furniture design for "Project Dishpan".

Before going into any detailed design work we would appreciate a detailed report on present day Methanian furniture on Arcturus IV. An analysis of the various positions of relaxation and physical habits of the Methanians would also aid us in our design.

Please look into this matter at your earliest convenience.
Thanks.

CONFIDENTIAL

INTER-OFFICE MEMO

Massachusetts Intergalactic Traders, Inc.

From: Arnold Edward

To: Furniture Design Division

Subject: "Project Dishpan"

File No. 3463

24 December 2951

Attached herewith is a copy of the report which you requested on 10 December 2951. I hope that the information provided in this report is sufficient.

Since the 21st of this month an inter-solar telephone system has been hooked-up between the Solar and Galactic Explorers Union and our front office to expedite work in Operation Arcturus. If any additional information is needed please inform me by phone, it would take about four days for information to be routed to this office from Arcturus IV.

Please keep in mind the deadline for the initial design project 17 January 2952. On that date all departments will meet in my office to discuss various designs for possible manufacture and sales.

A Merry Christmas to you and your family.

CONFIDENTIAL

Terran Exporting Counsel Headquarters

Spaceport 17321

Snafu

Arcturus IV

Office of General Information

Mr. Arnold Edward, Chief Designer
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Massachusetts
Terran

CONFIDENTIAL

Dear Sir:

At your request a survey was made on Methanian furniture at various private homes, libraries, theaters, schools and public auditoriums.

Much to my surprise Methanian furniture is quite standardized, but crudely built.

Methanian chairs are what might best be described in Terranian language as "saddle chairs". Due to their extreme arm and leg length the Methanians straddle their chairs as cowboys in the Western Terranian Plains straddle their horses. See enclosure one (1) of this letter.

Easel-type tables at a forty-five degree incline (similar to Terranian drafting tables) are used in the public schools and libraries, and the conventional flat-top table are used in the homes. The flat-top tables are usually about three feet high.

There are no lounge chairs to speak of, but a few crudely built chipped-stone chairs were found in several homes. They were almost impossible to move. The Methanian man seems to be most relaxed in chairs with seats in them like those found in Terran, but their physical make-up makes it almost impossible for them to do any active work in a sitting position.

As you can see furniture design is badly needed in Arcturus and it is heartening to know that your group is interested in this field. I am sure a good market can be found for your product.

I hope that the above information and enclosure will aid you in your work. Please do not hesitate to inform me if additional information is needed.

Methanianly yours,

/s/

Will Tellum
Asst. Director of Information

Received
Mass. Intergalactic Traders
18 Nov 2951

INTER-OFFICE MEMO

Massachusetts Intergalactic Traders, Inc.

From: Ronald Yoshida To: Arnold Edward
Subject: Arcturus IV File No. _____

17 January 2952

After receiving Mr. Harry's report on Methanian furniture our group decided that our first design product would be in the line of lounge chairs, which are so badly needed in Arcturus IV.

A careful study of the skeletal structure of the Methanian was made by my staff and the enclosures of this letter show the Methanian in a relaxed position.

Although my staff submitted a number of designs, Mr. Lane's chair was selected out of the lot. Sketches of other possible designs are shown in the enclosure.

Stresses and approximate weight calculation were made by my engineer and these values are quite agreeable to Methanian environment. Since price estimates were not available, they will be submitted at a later date.

Hoping that this design meets with the committees approval, I remain

Aesthetically yours,

/s/

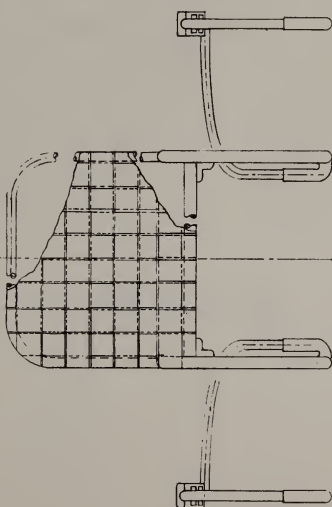
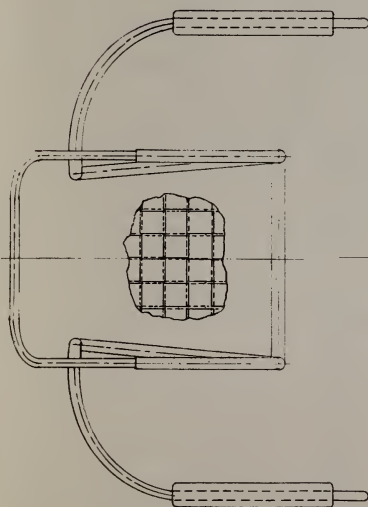
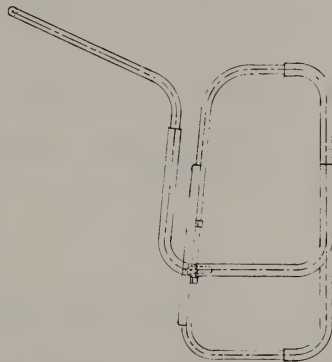
Ronald Yoshida
Chief of Furniture Design

CONFIDENTIAL

NO.	PART	MATERIAL
1	Body Frame (1" $\frac{3}{4}$ " Tubing)	Downmetal J-I
2	Seat (2" Strips)	Canvas
3	Arm Rest	Plastic
4	U-Clamp	Downmetal
5	Brace	Downmetal

Note

Weld All Tube Connections
Basket Weave Canvas



Massachusetts Intergalactic Traders, Inc.			
For	Title		
ARCTURUS IV	LOUNGE CHAIR		
DATE 1-17-52	DATE 1-17-52	DUE	
NOTE: ALL TOLERANCES UNLESS NOTED PARTICULARS - 1 R. - DIMENSIONS - 0.005			
ANGLES - 1 - BREAK ALL EDGES - 1 - WELD ALL JOINTS			
MADE IN U.S.A.	FINISH		
AS SHOWN	SCALE 3" = 1"		
TREATMENT			

ENGINEERING REPORT

Calculation of maximum stress on Lane's Chair:

Maximum load (approximately).....200 lb. (Terran)

Distance from front edge of chair
to C.G. of body (approx.)... 10 inches

Maximum stress taken in one inch tubular section
O.D.=1 inch I.D.=0.750 inch

$$I = \frac{\pi (d_o^4 - d_i^4)}{64} = 0.0836 \text{ in}^4$$

$$S = \frac{Mc}{I} = \frac{200 \times 10 \times \frac{1}{2}}{0.0836} = 29,800 \text{ p.s.i.}$$

At room temperature of 70 degrees Fahrenheit Dowmetal Tubing (Magnesium alloy) have the following characteristics:

DOWMETAL ALLOY	* T E N S I O N (P.S.I.)			COMPRESSION
	ULTIMATE STRENGTH	YIELD STRENGTH	% ELONG. IN 2"	YIELD STRENGTH
FS-1	33,000	16,000	8	10,000
J-1	36,000	16,000	7	11,000
M	28,000	13,000	3	6,000

Since alloy J-1 has the greatest strength properties it was selected. Although the calculated stress is much higher, magnesium alloys increase in strength at lower temperatures. Although data for the temperature range of -50 degrees C. to -110 degrees C. (or -58F to -166F) were not available the following is a list of properties at reduced and elevated temperatures for Dowmetal alloy J-1:

Temperature deg. F	TENSILE PROPERTIES		
	ULTIMATE STRENGTH p.s.i.	YIELD STRENGTH p.s.i.	ELONG. IN 2 " (%)
-100	48,000	38,000	13.0
70	45,000	31,000	14.0
200	42,000	26,000	31.0
300	30,000	20,000	40.0
400	21,000	15,000	42.0
600	8,000	5,000	70.0

* Minimum values

The nominal combination of Dowmetal Alloy J-1 is:

Aluminum	6.5
Manganese	0.2
Zinc	1.0
Magnesium	remainder

Magnesium alloys are not recommended for use with any of the nitrates, chlorides or acids, but it is highly recommended for ammonia (gas or liquid).

Weight Calculation: (Lame's Chair)

Dowmetal J-1 1" tubing 1/8" wall thickness	
0.264 lb/ft. approx. 146 in. used....	3.20 lb.
Dowmetal J-1 3/4" tubing 1/8" wall thickness	
0.189 lb/ft. approx. 150 in. used.....	2.36 lb.
Plastic arm rest	2.00 lb.
Weld, bolts, braces, canvas, etc.	2.00 lb.
	<hr/>
	9.56 lb.

Note: All data on magnesium was obtained from the Dow Chemical Company, Midland, Michigan booklet "Magnesium Design" and "Magnesium Alloys and Products".

massachusetts
intergalactic
traders, inc.

INTERGALACTIC CODE NO. 76
ADDRESS MITI

78 massachusetts avenue - cambridge, massachusetts - terran

OFFICE OF THE
CHIEF DESIGNER

16 January 2952

R. Z. Hollenhead
Massachusetts Intergalactic Traders
78 Massachusetts Avenue
Cambridge 39, Massachusetts

Dear R.Z.:

As you know, our experience in the design field is great and varied, or you would not have employed us. We reviewed the possible products that have been suggested to us, and have selected a few that we believe will aid the Methanians considerably in their way of life on that hellhole.

It occurred to me the other evening that the Methanians must beautify their yards in one way or another. I realize that everything grows upside down, but I suppose roots can be beautiful, too. Look at the potato! Our experience with lawn implements, lawn mowers, lawn rollers, and sprinklers (heh-heh) has given us the design know-how in this field, and we should capitalize upon it.

We would appreciate any additional information concerning the Methanians' yards, their substitute for grass if any, and how they manage the up-keep of their lawns.

With respect,

/s/

D. F. Rib

Lawn Sprinkler Sub-Division
Design Department

CONFIDENTIAL

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INTERGALACTIC CODE NO. 76
ADDRESS MITI

78 massachusetts avenue - cambridge, massachusetts - terran

17 January 2952

OFFICE OF THE
BOARD CHAIRMAN

Mr. D. F. Rib
Massachusetts Intergalactic Traders
78 Massachusetts Avenue
Cambridge 39, Massachusetts

CONFIDENTIAL

Dear D.F.R.:

We have inquired from our out-post on Methania concerning your suggestion. First good one you've had in decades. The following information has been given to us concerning the condition of the Methanians' yards. We hope it is satisfactory.

The Methanians have large yards because of the sparse population; therefore, they have sought to beautify their surroundings as much as possible. After years of cultivation, they have come up with the following species that is used universally upon their yards.

The species is known is herbivorous carnivorous arnoldious. It is tough and strong, although upon smoothening and ruffling it is soft and pliable. It becomes brown during the winter and greenish-brown during the summer months. The actual physical structure is shown on the accompanying sketch.

There is one serious draw-back to the use of this species of lawn covering. It requires careful planting and maintenance to keep the ground sufficient porous to grow the arnoldious and to realize the beauty of its full growth. Then the heartbreaking situation exists. The arnoldious, unlike our grass in Terran, does not grow continuously and, therefore, does not require constant cutting. It grows to full height (3 1/4 inches) and then uniformly remains at that height. However, the growth is not stagnant. The plant continually sends up new shoots which grow from the fibrous base and contribute to the density of the surface area. After a period of one year, the surface is so clotted with fiber that it becomes coarse and undesirable, and soon a mass dying takes place. The roots in an area of three or four square feet die simultaneously because of strangulation, leaving bare, unsightly spots upon the lawn which are dotted with the large dead fibrous roots. They're pure hell to walk on, even for the hoof-footed Methanians. The only solution is to pull out areas of the grass to allow for new growth. This must be done at randomly-spaced intervals to insure a uniform root surface, and the amount pulled out must be very small. Because of the toughness of the roots in tension, pulling too large a clump will uproot-oops-upstem-a large portion of the plant, and the result is an open space to be planted again. The vertical force to be applied to the surface fiber to uproot it cannot exceed six pounds. This force is enough to pull out a tuft of root 1/2 inch in diameter.

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No. 1, 1970

THE JOURNAL OF THE
ROYAL ANTHROPOLOGICAL INSTITUTE
LONDON

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THE JOURNAL OF THE
ROYAL ANTHROPOLOGICAL INSTITUTE
LONDON

Vol. 100, Part 1, 1970
No. 1, 1970

17 January 1952

As you see, the Methanians cannot have large yards because of the physical impossibility of weeding them, or cleaning them, or whatever you want to call it. When one heads home from work after a hard day at the office, he sees one Methanian after another plucking away at their lawns, most of them using their own wonderful cussing that they've developed. If you could develop a machine to simplify this job, we could make a mint. More power to you.

If you need more information, let us know soon.

Returning your compliments,

/s/

R. Z. Mollenhead

Chairman of the Board

CONFIDENTIAL

massachusetts
intergalactic
traders, inc.

INTERGALACTIC CODE NO. 76
ADDRESS MIT:

78 massachusetts avenue - cambridge, massachusetts - terran

OFFICE OF THE
CHIEF DESIGNER

17 January 2952

R. Z. Hollenhead
Massachusetts Intergalactic Traders
78 Massachusetts Avenue
Cambridge 39, Massachusetts

Dear R.Z.:

CONFIDENTIAL

Enclosed please find the requested design for a lawn conditioner for the Methanians. We hope it fulfills your expectations. The following is a description of its operation.

The "Cleenpull" Lawn Conditioner is designed to perform three functions; (1.) to pull forty tufts of root at once, (2.) to pick these tufts up and deposit them in the drawer provided, and (3.) to smoothen and ruffle the roots which pass under the mechanism.

The machine is fitted with two carriages under the forward portion. Each carriage contains forty semi-circular prongs which are forced together to grip tufts of roots in a vice-like fashion. The hydraulic system provides the necessary vertical force to extract the tufts from the remainder of the lawn. The hydraulic system closes the jaws about the tufts as well. These two actions are produced simultaneously. Springs are provided to open the jaws and return the carriages to their proper locations during movement of the Conditioner by spring systems.

Because of the large mechanical advantage required, the hand lever on the handle of the mechanism must be pumped 2.86 times before the tufts are extracted. A ratchet system is therefore required to hold the cylinder plunger in place while the hand actuating lever is returned to its former position prior to beginning another power stroke. A simple ratchet is affixed to the piston rod. This is released by a reel arrangement upon the handle.

The vertical motion piston and the horizontal motion piston are both connected to their respective carriages by yokes. These yokes are provided because of the large forces involved, resulting in large moments.

The tufts which are extracted from the root bed are picked up by the pronged wheel which is rotated by a chain or belt connected to the rear wheel. The tufts are collected in a removable drawer on the side of the mechanism. The ruffling and combing action provided by the device is accomplished by a hemp brush attached to the rear wheel axle.

Weight was conserved wherever possible. The body of the mechanism is of cast aluminum. Upon it are fitted all of the parts: the carriages, wheels,

17 January 2952

brush, pronged wheel, and collection drawer. Aesthetic beauty was added by the aluminum case which covers the working mechanism and protects it from the elements. The case is also of cast aluminum. It is clamped to the base by projections cast into the base upon manufacturing. A handle is provided in the case to lift it from the base. The handle also adds to the aesthetic appeal of the product by providing variety for the otherwise plain surface.

An aluminum-tungsten alloy was utilized where strength and lightness had to be combined. Steel was used only in the parts where large forces would prevail or where manufacturing difficulties would be met if the part were manufactured of other metals (for instance, the springs).

The weight of the entire assembled product is estimated as 15 or 20 pounds.

It is noted that the bottom of the base is considerably above the wheel bottoms. This is provided because the machine, due to its weight, will sink into the root surface until it rests upon the second layer of branches. The base of the machine will therefore be in its best position to grasp the roots. After experimentation on Methania, the wheel height can be adjusted so that the optimum height is reached. The operator will not experience undue resistance to movement of the machine through the roots if the weight of the machine rests completely upon the wheels, which of course, is desired.

It must be emphasized that the device is stopped before it is operated.

We of the design department sincerely hope that this creation will help the Methanians to acquire a living standard comparable to ours.

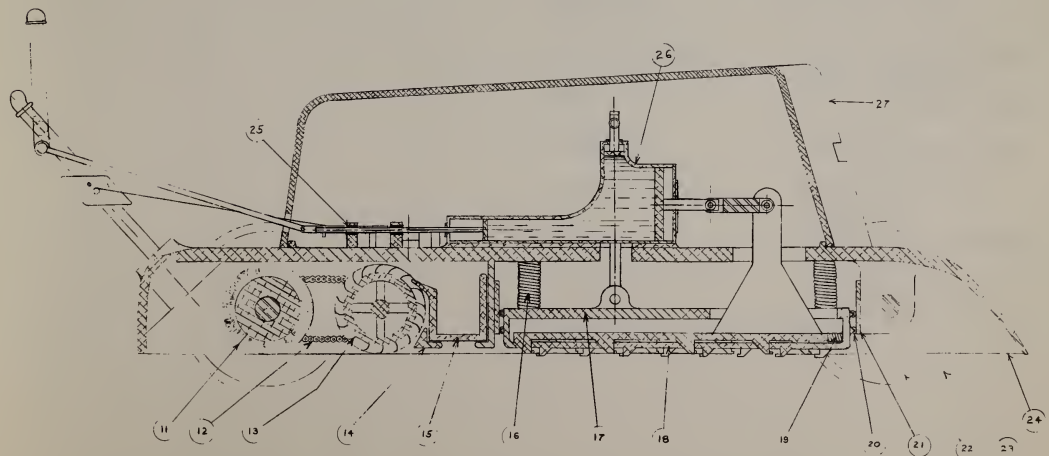
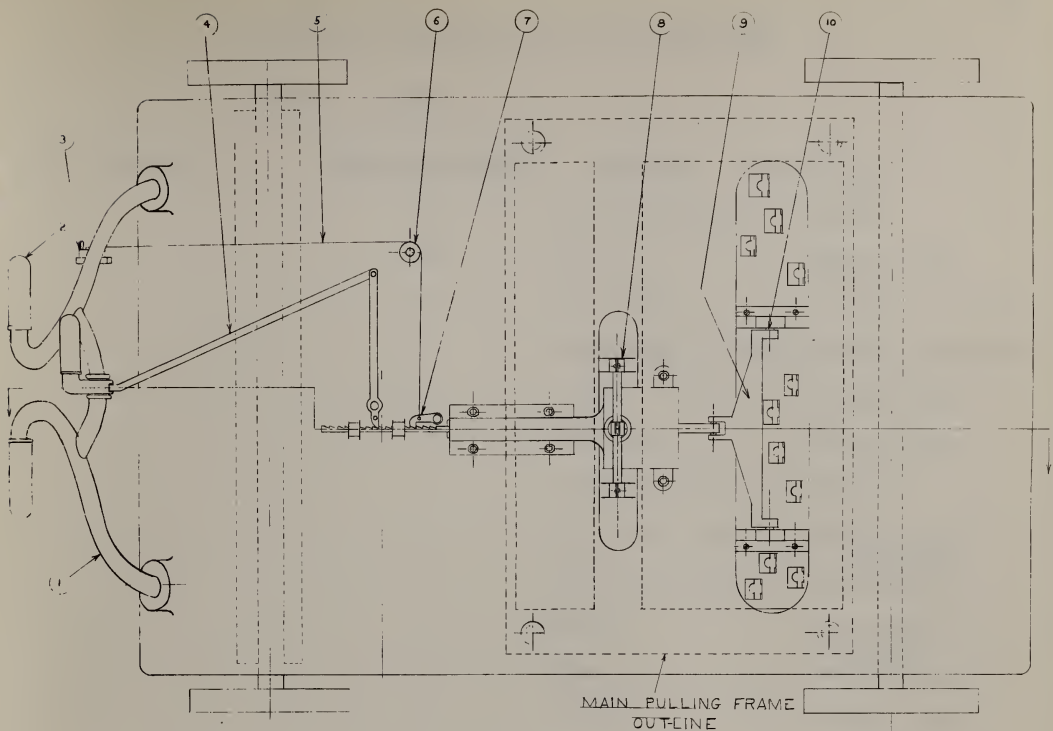
Sincerely,

/s/

D. F. Rib

Lawn Sprinkler Division
Design Department

CONFIDENTIAL



METHANIA'S "CLEAN-PULL" LAWN CONDITIONERParts List

<u>Part Number</u>	<u>Number of Parts</u>	<u>Material</u>	<u>Part Name</u>
1	2	Drawn aluminum	Handle
2	2	Nylon	Handle grip
3	1	Aluminum	Pressure release
4	1	Al.-Titanium alloy	Ratchet assembly
5	1	Steel	Release wire
6	1	Aluminum	Pulley wheel
7	1	Al.-Tit. alloy	Ratchet
8	1	Al.-Tit. alloy	Pulling yoke assembly
9	1	Al.-Tit. alloy	Clamping yoke
10	2	Steel	Clamping yoke bearing
11	1	Hemp	Combining brush
12	1	Steel	Driving chain
13	1	Steel wire	Tuft catcher
14	1	Aluminum	Pan support
15	1	Aluminum	Catcher pan
16	4	Steel(spring)	Pulling mechanism drop spring
17	1	Aluminum	Main pulling frame
18	1	Aluminum	Sliding grasping frame
19	2	Steel(spring)	Grasping frame spring
20	8	Steel	Main frame bearing wheels
21	4	Aluminum	Bearing wheel track
22	4	Aluminum	Wheel

METHANIA'S "CLEAN-PULL" LAWN CONDITIONER

Parts List; Continued

<u>Part Number</u>	<u>Number of Parts</u>	<u>Material</u>	<u>Part Name</u>
23	4	Nylon	Tire
24	1	Aluminum	Main frame
25	2	Nylon	Ratchet assembly bearing
26	1	Aluminum (Oil filled)	Hydraulic actuating cylinder
27	1	Aluminum	Cover

**massachusetts
intergalactic
traders, inc.**

INTERGALACTIC CODE NO. 78
ADDRESS MITI

78 massachusetts avenue - cambridge, massachusetts - terran

OFFICE OF THE
SALES MANAGER

17 September 2952

R. Z. Hollenhead
Massachusetts Intergalactic Traders
78 Massachusetts Avenue
Cambridge 39, Massachusetts

CONFIDENTIAL

Dear R. Z.:

As you pointed out in our last board meeting, the sales picture on those latest designs has been terrific! Our sales organization has been doing a swell job in the furniture and household appliances division, and our Methanian pals are snatching up our entire output even before it hits T.E.C.H. Spaceport!

I think it is time we really hit the big time, though. As an old used turbocar salesman, you know I have been itching to have some transportation devices developed for sale on Arcturus. They have got their battery - powered scooters, I know, but if I had a couple of really slick vehicles to offer them, we would really put some life into this business.

These vehicles need not be too fancy, at first - at least nothing like the '53 Turboglides we bat around in on Terra. I don't think they would be able to handle speeds we can coax out of our induction accelerators, either. They are a slow moving bunch, and their roads are pretty sad affairs, don't forget, but the Design Division should be able to come up with something safe and comfortable, with the kind of styling that will make them stand up and take notice when we take them into the showroom. I know of a couple of hotshot salesmen that I think I could shanghai from Generalized Motors if the opportunity were here. We have already got the distribution problem licked, and have the showrooms already set up, so it is a natural for doing a bang-up job with transportation units.

Give it some thought, R. Z., and let me know how you feel about it. Who knows - you are liable to be the Henry Ford of Arcturus IV!

Very truly yours,

Lean Dent

**Received
Mass. Intergalactic Traders
1 Oct. 2952**

Lean Dent ("The Smiling Terranian")
Sales Manager
Massachusetts Intergalactic Traders

massachusetts
intergalactic
traders, inc.

INTERGALACTIC CODE NO. 76
ADDRESS MITI

78 massachusetts avenue - cambridge, massachusetts - terran

OFFICE OF THE
BOARD CHAIRMAN

CONFIDENTIAL

27 September 2952

Mr. Arnold Edward
Chief Designer

Dear Arnold:

This letter will confirm the talk we had over the weekend on the possibilities of developing suitable transportation for the inhabitants of Arcturus IV.

After reconsidering your ideas, and the strong feelings of the sales division, I would suggest that you proceed at once with the program you have outlined. All material connected with the project should be classified as "Secret". You can imagine the reaction among our competitors if word leaks out. We are starting from scratch in this transportation game, and we will need all the head start we can get.

The development work will be called "Project Anti-Freeze", and you can draw your expenses from order NO. OK 2735 until we have the accounting department set the project up on the budget. You can see that I want this thing to get under way immediately.

Drop you work you have been doing, and get some people to take the administrative work off your neck. The preliminary design deadline is tentatively set for 6 November, and I am counting on you to crack the whip.

Yours very truly,

R. Z. Hollenhead
R. Z. Hollenhead
Chairman of the Board

Received
Mass. Intergalactic Traders
1 Oct. 2952

CONFIDENTIAL

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INTERGALACTIC CODE NO. 78
ADDRESS MIT

78 massachusetts avenue - cambridge, massachusetts - terran

COPY

OFFICE OF THE
CHIEF DESIGNER

29 September 2952

Mr. Will Tellum
Assistant Director of Information
T.E.C.H. Spaceport 17321
Snafus, Arcturus IV

Dear Mr. Tellum:

It seems that I never have enough technical information about the Methanians to keep me happy. This time we are doing some classified work called "Project Anti-Freeze" and I need some help again.

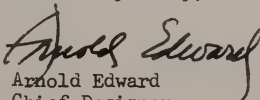
I contacted J. S. Wick on Terran, but he did not have the information on hand, and he suggested that I write to you direct. The work that I am doing requires some knowledge of the stimulus-response time characteristics of Sub-Human type SH-1406-A. Since we are designing equipment which must be manually controlled by the average Methanian, and where a safe margin of response time must be provided to insure danger-free operation, I will need a breakdown of audio and visual response times. While you are collecting this information, it might also be worthwhile to explore the possibilities of using tactile stimuli as a warning signal.

In addition to the psychological information cited, I would also like to know something of the machinery repair facilities available on Arcturus, as well as the average skill of the Methanian mechanic as compared to Terranian workmen, including their ability to adapt themselves to new tools and techniques.

If there are any unusual conventions of Methanian machine design, such as thread sizes, keys, rivets, or gear profile, please let me know so that I can avoid unnecessary confusion on Arcturus.

Thanks for your cooperation, and I will appreciate having this information as quickly as possible.

Yours very truly,


Arnold Edward
Chief Designer

CONFIDENTIAL

Terran Exporting Counsel Headquarters

Spaceport 17321

Snafu

Arcturus IV

Office of General Information

CONFIDENTIAL

12 October 2952

Mr. Arnold Edwards, Chief Designer
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Mass. Terran

Dear Arnold:

Busy as I am, I sent some of my boys out to see if they couldn't dig up the information you requested in your letter of 29 Sept. I don't know what's the matter with J. S. Wick these days. He never has the information you fellows want and makes no effort to get it. He must think that because my days are 159 hours long I can do anything and everything - the rat.

Now to answer some of your questions. (See the enclosed report on the S-R time investigation.) Apparently intelligent life is much the same the galaxy over when it comes to accepting innovation. Whether we are decendents of birds or monkeys we seem to identify ourselves with the present and past and resist, as much as possible any change. Therefore, I'm sure, you'll have to go very slowly as you introduce powered transportation devices. Their present electric skooters are very slow moving vehicles and are limited to very small ranges. Don't be "too advanced" in your thinking. Bring them along in easy stages.

The Methanian workmen are very patient, concientious and skilled mechanics. With the necessary materials and equipment they can copy practically anything you send up here, but they like ourselves, prefer to work on things they understand. Let's advance their technology gradually and we'll have less trouble and quicker acceptance of our ideas.

Do not worry about thread sizes, gear profiles, etc. The Methanians are well acquainted with the helix and involute.

Best regards,

Will

Will Tellum

Received
Mass. Intergalactic Trade
21 Oct. 2953

CONFIDENTIAL

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE 10 October 2952

FROM Special Investigator X

TO Will Tellum

SUBJECT Methanian S-R time

FILE NO. SR 1001

CONFIDENTIAL

This report covers the tests carried out on Methanian Type SH1046-A males and females to determine the value and range of stimulus response time using various stimuli and responses. The stimulus which evokes a motor response usually involves some type of sensory discrimination - visual, auditory, factual, or kinesthetic. The stimulus is specific to a task to be performed and may be a single signal or, more commonly, a complex situation; several stimuli, or a continuously changing stimulus. The responses all involved movement reactions and they can be classed as (1) discrete, involving a single unitary movement of any member of the body; (2) repetitive, discrete movements performed a number of times; (3) serial, a number of discrete movements involving starting and stopping, and changes in direction, each of which is stimulated by changes in the stimulus, and; (4) continuous, constantly changing motor adjustments made in response to constantly changing stimulus condition.

Both simple RT and complex (or disjunctive) RT's were measured. Details of all tests are included in Report SR-1002, Sect. A-B, Appendix Q, this report briefly summarizes some of the more important results.

Test I. Experiment: Subjects were required to respond as quickly as possible by pressing a bell-button when a visual or auditory stimulus was presented.

Experimental Conditions: Apparatus: d'Arsonval clock. Stimuli: bell and light. Stimuli presented in fairly rapid sequence, at irregular intervals, with no other "ready" signal. 25 dials per series. Subjects completed from 1 to 21 series. 178 male subjects, ages 1 to 6 Arcturian years.

Results:

<u>Stimulus</u>	Mean RT (in msec)	Range (in msec)	SD (in msec)
Auditory	1151.4	726 - 2592	112.7
Visual	1731.6	1140 - 2856	118.9

Received
Mass. Intergalactic Trad
21 Oct. 2953

All tests seemed to go in much the same pattern as the one above and in general the RT's for the Methanians were from 5 to 6 times those measured in normal Terranians. It appears to be perfectly safe for design purposes to multiply Terranian SRT data by a factor of 5 when applied to Methanians.

This data, of course, imposes some very serious design limitations which must be given careful consideration by all designers. WARNING: It is the consensus of all concerned that this slow S-R time should not be compensated for by the addition of complicated electronic control equipment at this stage of the Methanian culture. Consider the safety of the operator of any machine or product by limiting the performance of same.

massachusetts
intergalactic
traders, inc.

INTERGALACTIC CODE NO. 78
ADDRESS MIT

78 massachusetts avenue - cambridge, massachusetts - terran

OFFICE OF THE
CHIEF DESIGNER

CONFIDENTIAL

30 October 2952

Mr. R. Z. Hollenhead
Chairman of the Board
Massachusetts Intergalactic Traders

Received
Mass. Intergalactic Traders
1 Nov. 2952

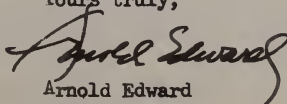
Dear Mr. Hollenhead:

I think you will be pleased with the results of "Project Anti-Freeze" which I have enclosed with this letter. The research program we have been carrying out is, of course, incomplete, but I think we are well on our way.

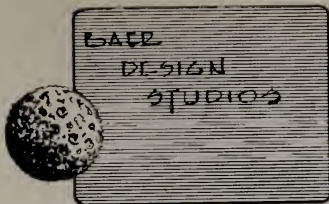
In view of the urgency of getting the first transportation units in the hands of our M.I.T. salesmen on Arcturus as quickly as possible, I should like to recommend that we proceed at once with preliminary full-scale models of the "Eggomobile" and the "Acustom Coupe". As you know, we have not completed the production engineering for these two vehicles, and the performance characteristics are still somewhat uncertain from our drawing board studies. I believe, however, that we have come to the point where we should have some trial machines built, or at least prefabricated, for assembly on Arcturus IV. The biggest handicap in designing machines of this size is in attempting to duplicate arcturian gravity and weather conditions on Terra. A road and field testing program has been arranged in cooperation with Will Tellum's group on Arcturus, and it awaits only the approval of funds for the project by the Board.

I have taken the liberty of having an animated film made up by our art department which should be of considerable aid in "selling" the ideas to the Board members. When the date for the meeting has been arranged, I can plan to be present to further explain some of the technical aspects of our program to the group. It is going to take a Monorail-car full of credit units to do it up right, but I am sure the cost will be justified when we get these vehicles on sale.

Yours truly,



Arnold Edward
Chief Designer



23 October 2952

Mr. Arnold Edward
Chief Designer
Massachusetts Intergalactic Traders
78 Massachusetts Avenue
Cambridge 39, Massachusetts

CONFIDENTIAL

Dear Mr. Edward:

Subject: Consulting services rendered, "Project Anti-Freeze", report on.

Enclosed please find the preliminary drawings we have prepared for your approval. We have tentatively called our design the "Eggomobile", and we herewith present a brief description of the device.

The machine consists of two basic components; the spherical, silicone-rubber covered tread on which it rolls, and the outer egg-shaped passenger shell. The outer shell is supported by a tranverse axle through the sphere which propels the vehicle. This axle is fixed with respect to the outer shell, while the sphere is free to rotate on internal bearings. Power is provided by an internal combustion engine of the oxygen burning type, geared to revolve the sphere around the fixed axle. The engine is supported by this axle, and is thus permanently located with respect to the outer shell, although it is wholly inside the sphere. By means of suitable counterweights below the centroidal axis of the entire vehicle, the machine remains stable, and is steered as shown in the drawing.

The egg-shaped appearance was selected for safety in operation as well as the psychological appeal which we plan to stimulate. Although the machine travels at an average speed of six miles per hour, the slow stimulus - response pattern of the Methanian people will probably make an occasional collision inevitable. The shape of the vehicle would provide maximum safety, since the outer shell presents no sharp projection which might injure pedestrians, and it would suffer hardly more than a glancing blow should two vehicles collide. The "Eggomobile" would absorb the greater part of the impact energy by rolling with the blow, and automatically righting itself. Naturally, the egg shape should be an asset in selling the machines, since the Methanians are egg laying creatures, and this design suggests the protective security they enjoyed before hatching.

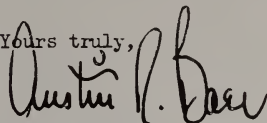
We at the Studios feel that the design is simple and attractive, and should be readily saleable as an introductory vehicle. The outer shell

Received
Mass. Intergalactic Traders
21 Oct. 1952

23 October 2952

could be finished in a nice selection of colors, with any suitable Methanian symbolic decoration optional at extra cost for those who want a distinctive "look". Please let us have your comments, so that we can proceed with the working drawings.

Yours truly,



Austin R. Baer
President
Baer Design Studios

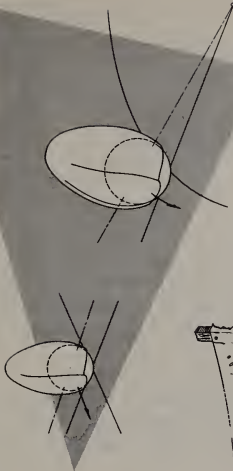
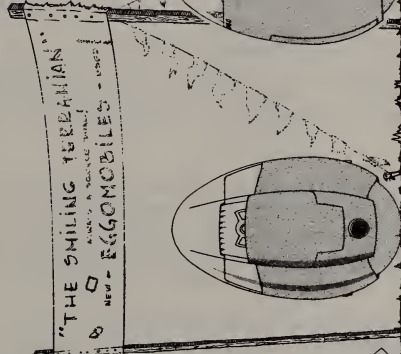
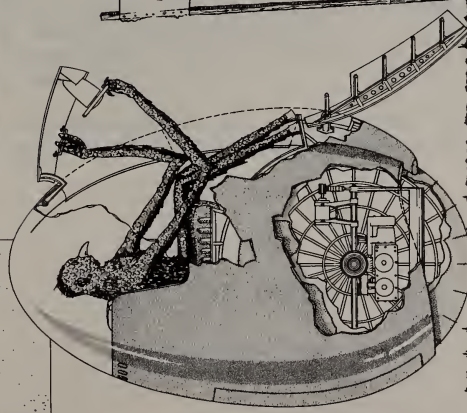
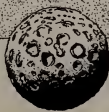
CONFIDENTIAL

Received
Mass. Intergalactic Traders
25 Oct. '52



BALD DESIGN STUDIOS

EGGOMOBILE



SALES FEATURES

- * MAXIMUM SPEED: 8 M.P.H. +
- * ENGINE: 4 CYLINDER OPPOSED
- * HIGH SEAT POSITION - GIVES MAXIMUM RANGE OF VISION
- * ELECTRICALLY OPERATED SEAT POSITION FOR COMFORT
- * ELECTRIC RADIO-STEERING
- * SHORT STEP-BIKE HEIGHT - TEARS LINKED TO FOLD UP AS ENTERING VEHICLE
- * AIR-LOCK DOOR (CONTINUOUSLY LOCKED)
- * BALLAST WEIGHTS ADJUST VERTICAL TEND FOR BALANCE
- * DESCRIBED STEERING SYSTEM ON BALLAST WEIGHTS
- * ALUMINUM FRAME USED
- * AIRPLANE-TYPE CONSTRUCTION
- * SAFETY-COATED RUBBERIZED SHELL-STEATED ALUMINUM
- * SHOCK-ABSORBER, ENCLOSED
- * TENDS TO CLERTS FOR AMPHIBIOUS OPERATION, COMPLETED WITH SHOCK-ABSORBERS
- * EXHAUST COLLISION PROOF
- * PSYCHOLOGICAL SECURITY

AUSTIN & BIRD 10285

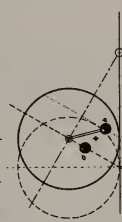
FRONT VIEW SHOWN IN EACH CASE.



- * CENTER OF GRAVITY IS IN FRONT OF CENTER OF MASS
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CONFIDENTIAL REPORT

Massachusetts Intergalactic Traders, Inc.

From: Geochani To: Arnold Edwards
Subject: Project Anti-Freeze File No. GG. 432

CONFIDENTIAL

26 October 2952

In spite of all the discussion and the general consensus that the vehicular design for Arcturus IV must be quite primitive in order that it be readily accepted by the Methanians, the attached design (as you will easily see) is quite to the contrary.

The writer says "to hell with history" -- let's see if it isn't possible that a relatively primitive culture will accept a radical, advanced design. The "Acustom Coupe" is limited at present to a slow 15 mph maximum, but is so designed that it can easily be converted to travelling at much higher speeds.

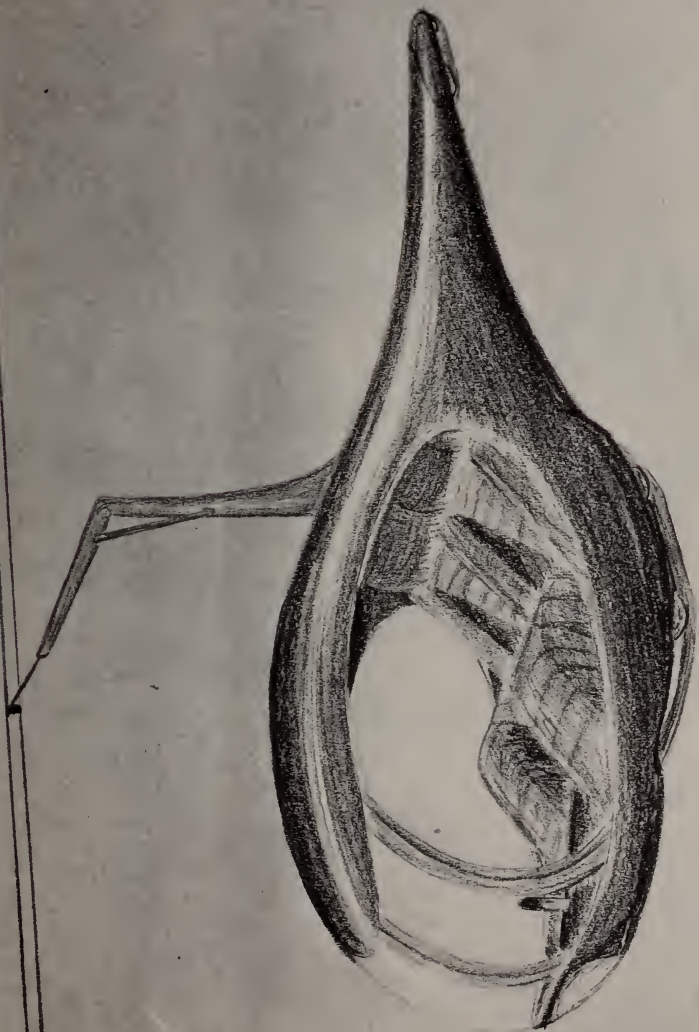
It is a two passenger conveyance, streamlined to the nth degree. It is powered by an electric motor which is supplied by a dual conductor cable and trolley. The large, flexible driving wheels (which provide traction as well as differential steering) adapt the vehicle to any type of terrain in the same manner as the tracks of a tank.

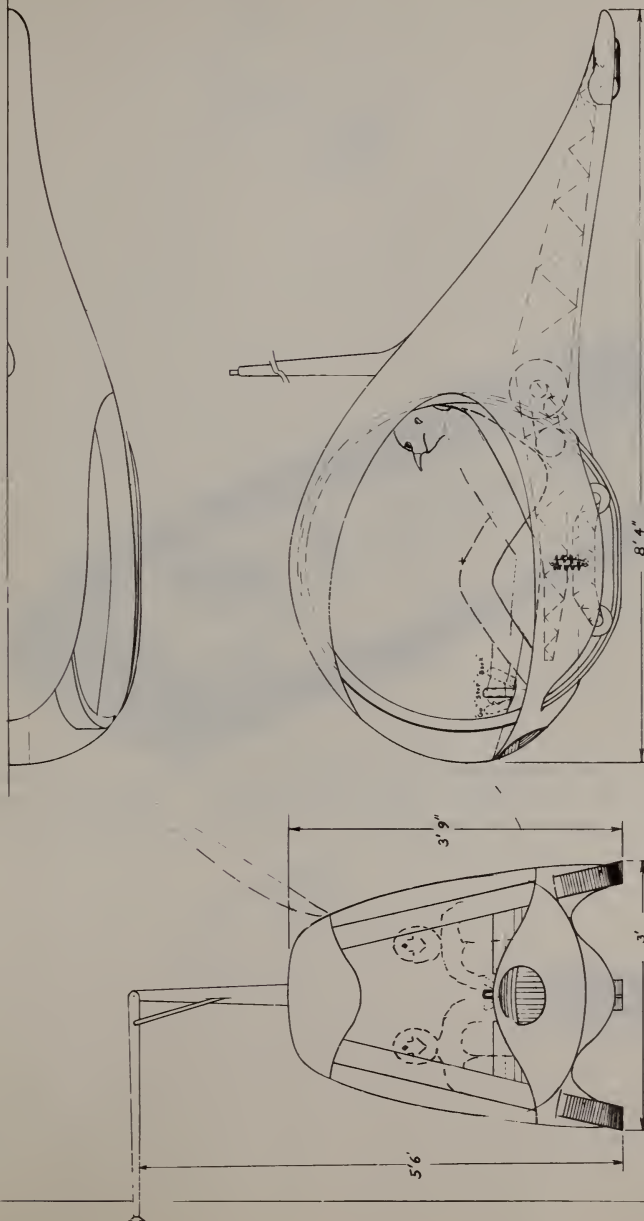
Although, as it is presently sketched out, the Acustom coupe is limited to previously laid out cable paths, this limitation could be overcome by providing ample storage battery capacity for short runs away from the cable. Something of this nature would probably be necessary for passing or meeting another car on the same line.

The writer hopes that M.I.T. will give this design the "green light" in order that we can test out this "resistance to innovation" theory.

CONFIDENTIAL

Acustom
by Geo Cheni

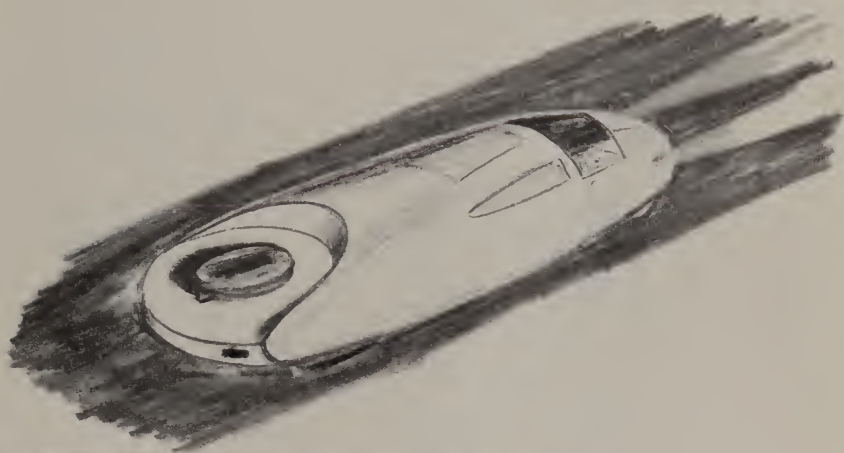




Massachusetts
Intergalactic
Traders, Inc.

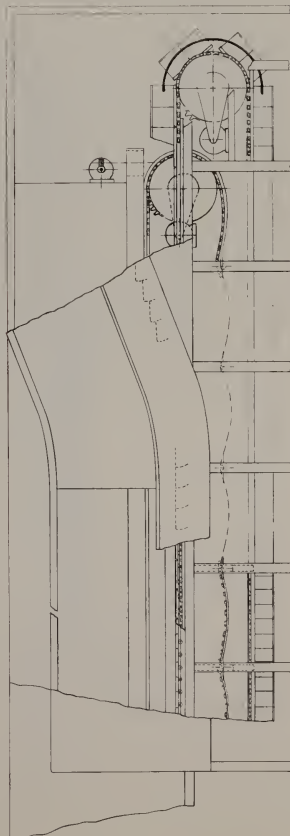
FOR	ARC TURUS IV		TITLE "ACUSTOM" PERSONAL AND TRANSPOR	
DATE	12/60	DATE	12/60	BY
NOTE: ALL TOLERANCES UNLESS OTHERWISE SPECIFIED ARE DECIMALS OF AN INCH		FINISH		
NOTES: 1 - REFER ALL OTHERS TO THIS DRAWING		TREATMENT		
SCALE		SCALE 1/4" = 1'		
PART NO.		ASSEMBLY		

MAX. SPEED - 10 MPH (m)	POWER - ELECTRIC
CAPACITY - 50 LB. MASS	SOURCE - 2 HP
WEIGHT (DRY) - 100 LB	BATTERY POWERED FOR
CONTROLS - SINGLE "JOY STICK"	PASSING 400 LINE USAGE
TAIL WHEEL STEERING	AUTOMATIC BATTERY CHARGING
MATERIALS - STRUCTURAL 4 SKIN - ALUMINUM	WHEN USED ON LINE
INTERIOR - 100% POLYURETHANE	VACUUM DEPLETED HARD
WHEELS - 100% POLYURETHANE	WHEELS - 100% POLYURETHANE
SUSPENSION - RUBBER - POLYURETHANE	WHEELS - 100% POLYURETHANE
RESISTANCE OF FLEETING TRACK	WHEELS - 100% POLYURETHANE



PRELIMINARY PERSPECTIVE SKETCH





FOR	ARTURUS IV		INTERURBAN UNDER	
DATE	1/2/68	TIME	11:00	11:00
NOTE	WAS TO BE OBSERVED IN THE POLYMER, BURN 17.40 BETWEEN 005			
ANALYST	DR. J. L. LEE			
MATERIAL	POLYMER			
TREATMENT	BURN 17.40			

Massachusetts
Intergalactic
Traders, Inc.

FOR *Anturus IV*

TITLE

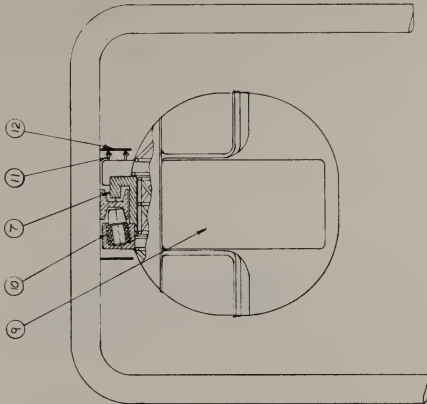
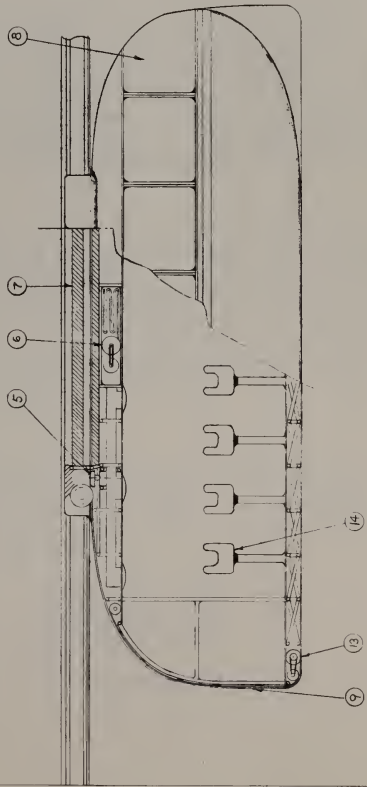
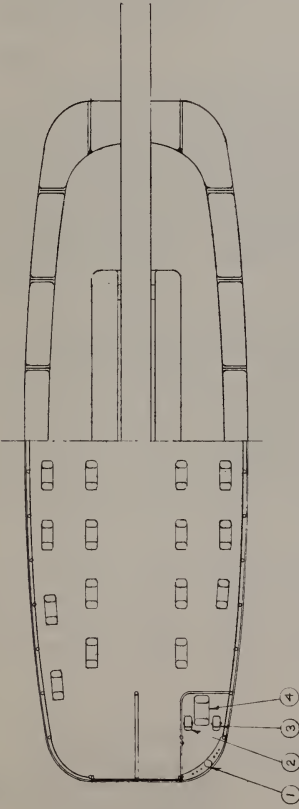
1/3700 Hull

DESIGNED BY *W. H. S.* DATE *1/10/54* DRAWN BY *W. H. S.* SCALE *1" = 1'*

NOTE: ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED. ROUNDED CORNERS AND EDGES. REMOVE ALL BURRS.

MATERIAL _____ FINISH _____ PART NO. _____

TREATMENT _____ SCALE *1" = 1'*



TERRAN

EXPORTING

COUNSEL

INTERGALACTIC CODE NO. 19
ADDRESS TECH

HEADQUARTERS

Hexagon Building - 187 Level - Washington 99 - Terran

23 January 2953

Mr. R. Z. Hollenhead
Massachusetts Intergalactic Traders
78 Massachusetts Avenue
Cambridge, Massachusetts

CONFIDENTIAL


Dear Zepp:

I have just received word from J. H. Rones, who, as you may know, has been on Arcturus IV for the past three weeks. John, as you remember from that weekend we spent together in New York, is quite the gourmet. How he keeps from getting ulcers from the weird foods he eats is beyond me. At any rate, he has been dying to sample some Methanian "Mulp". So far he has not been able to find any in Snafu, although they are in season at this time of their 2720 day year. The plant seems to be so high in food value that the entire crop is reserved for Methanians, so the Spaceport restaurant does not serve any.

John talked to Will Tellum about it, and Will told him that the entire harvesting situation is pretty poor on Arcturus because of the upside-down growth of the plants, together with rather primitive harvesting methods. He suggested long ago that it might be a wonderful field for development by your organization, and I think he is right. If your designers get busy with some of these vegetation problems, it would make your outfit a byword among Methanian farmers, who, after all, make up most of the population. I am sure you could set up the same type of spacemail-order business that Rears Sawbuck does here on Terra.

If you would like to get together on this, next weekend would be a swell opportunity. The wife is going to be out of town with the kids, and I thought I would run up to the country house for a few days. You could meet me there Thursday night. Don't forget to bring along that cute secretary. I am sure we will have lots of dictation for her.

Very truly yours,



K. "Snowbound" Wad Lee

Received
Mass. Intergalactic Traders
25 Jan. 2953

INTER-OFFICE MEMO
Massachusetts Intergalactic Traders, Inc.

From: R. Z. Hollenhead To: Heads of all Departments
Subject: Arcturus IV File No. 5482

14 February 2953

Gentlemen:

A new design project planned to facilitate the harvesting methods employed by Methanian farmers has been inaugurated.

The project will be under the direct supervision of Mr. Arnold Edward, our Chief Designer. It will be referred to in inter-office communications as "Project Harvest Moon."

Information pertaining to design will be made available in the engineering library. In view of past experience with regard to haphazard communication with the Director of Information by all department heads, all further inquiries will first be cleared with Mr. Edward before mailing. This will eliminate the confusion and ease the burden on Mr. Will Tellum's staff.

CC: A. Edward - Chief Designer
Shelton Maw - Production Manager
Shoven Leare - Chief Engineer
Lean Dent - Sales Manager
J. Sapmill - Associate Designer
Randy Toot - Field Engineer

CONFIDENTIAL

**massachusetts
intergalactic
traders, inc.**

INTERGALACTIC CODE NO. 76
ADDRESS MIT.

78 massachusetts avenue - cambridge, massachusetts - terran

OFFICE OF THE
CHIEF DESIGNER

21 February 2953

Mr. Will Tellum
Assistant Director of Information
T.E.C.H. Spaceport 17321
Srafus, Arcturus IV

Dear Mr. Tellum:

We are finally getting to work on your pet project. I just received authorization to go ahead on "Project Harvest Moon", and I need some dope on the agricultural situation on Arcturus.

Please forward a list of the edible plants on Arcturus, especially those which have not been readily available to the Methanians because of harvesting difficulties. I would like to have samples, if possible, which you might ship in the frozen state. No specific information about plant growth or soil consistency is available as yet in the T.E.C.H. library, so I would appreciate detailed descriptions of those plant forms which would be worthwhile developing from a marketing standpoint. Any psychological data on Methanian food prejudices, as well as existing farming methods, the size of Methanian farms, whether they work their land in groups or alone, and the speed with which they now harvest would certainly be a great asset in planning our program.

Thanks very much for your help. Hope we will be able to get you and John that "Mulp" dinner you have been wanting.

Yours very truly,

/s/

Arnold Edward
Chief Designer

Terran Exporting Counsel Headquarters

Spaceport 17321

Snafu

Arcturus IV

Office of General Information

7 March 2953

Mr. Arnold Edward, Chief Designer
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Massachusetts
Terran

CONFIDENTIAL

Dear Arnold:

Until our investigation of the various types of Methanian plant life is ready, here is some general information for you to start with.

SOIL - Volcanic ash - much like ground Mica.
density on Terran - 24 lb per cubic ft.
" " Arcturus - 270 lb per cubic ft.

THE PLANTS - All plants bear fruit under ground, therefore it is necessary to harvest by some digging process. The fruit ranges in size from that of a golf ball to that of a watermelon. It grows at depths of 1/2 foot to 10 feet under ground. (Note - each plant seems to have its own depth.)

METHANIAN HARVESTING METHODS - The Methanians simply dig down to the fruit with crude shovels and pick the fruit by hand. One of the biggest problems is the breaking up of hard spots in the ground and cutting the tendrils of the underground weeds. This is because the Methanians move too slowly to give impact loads to their shovels necessary to cut and break easily. With a shovel a Methanian can move about 5 1/2 cubic feet of soil per hour. (See accompanying study.)

I will soon have a more detailed report for you. Good luck.

Yours,

Will Tellum

Will Tellum
Asst. Director of Information

CONFIDENTIAL

Received
Mass. Intergalactic Traders
21 March 2953

Terran Exporting Counsel Headquarters

Spaceport 17321

Snafu

Arcturus IV

Office of General Information

CONFIDENTIAL

14 March 2953

Mr. Arnold Edwards, Chief Designer
Massachusetts Intergalactic Traders, Inc.
78 Massachusetts Avenue
Cambridge, Mass. Terran

Received
Mass. Intergalactic Traders
21 March 2953

Dear Arnold:

Some of the detailed information that you requested is beginning to filter into my office here at the Spaceport and as fast as it comes in I will relay it on to you. I am including in this letter some reports and drawings on two of the important Methanian plants for which we would especially like to see some harvesting equipment. These designs should carry a rather high priority number as these poor Methanians are in desperate need of a large quantity of high energy food. You too would be damn sick of eating mostly worms, insects and low quality meats.

In addition to the information I sent you last week on the Methanian soil, I am sending you a sample box of soil with a little surprise in it. Something for the kiddies (ha-ha).

Your pal,

Will

Will Tellum
Asst Director of Information
T.E.C.H.

*See enclosed photo
for the surprise.
a petrified Methanian head!!*

WZ.

CONFIDENTIAL



TECH SPACEPORT 1/321
ARCTURUS IV

TO:
MASSACHUSETTS INTERGALACTIC TRADERS
RESEARCH DIVISION
78 MASSACHUSETTS AVE.
CAMBRIDGE 39, MASS.,
U.S.A., TERRAN

RUSH!

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE 14 March 2953

FROM Will Tellum

TO Arnold Edward

SUBJECT Methanian "Mulp" Plant

FILE NO. HM3463

While the mulp is not a staple food of the Arcadians, it is believed that if better means of harvesting could be devised, it would become one of the main items in their diet.

The fruit is quite small (see sketch), and in appearance is quite similar to the terranian plum, except that it has a rather tough, horny skin. It is very high in food value; so high, in fact, that the average Methanian can live for several weeks on less than a bushel of them. The tree on which the fruit grows is perennial, and the present method of harvesting is as follows: The ground is dug up with hand shovels around the tree to a depth of some 1 1/2 feet, and about half of the crop is "picked" with trowels. The balance of the crop is left to rot, because if any more of the "branches" were exposed, the tree would die from overexposure to the atmosphere. Even with this method of harvesting, it is necessary to let the following year's crop go unpicked, to permit the tree to regain its strength, for digging to a depth of even 1 1/2 feet permits enough Methane to seep through the soil to weaken the tree considerably.

If some method could be found to extract the fruit without excavating or exposing the tree too much, the entire crop could be picked every year, which would effectively quadruple the output of each tree. (Incidentally, a device which could accomplish these ends would prove successful saleswise).

It must be remembered, however, that the Methanians are somewhat similar to we Terranians with respect to acclimating themselves to rapid changes in technology, and thus, the device must be simple enough so they can understand it readily, and should not be so rapid in operation that it will displace too large a portion of their labor force, upsetting their economy.

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE 9 March 2953

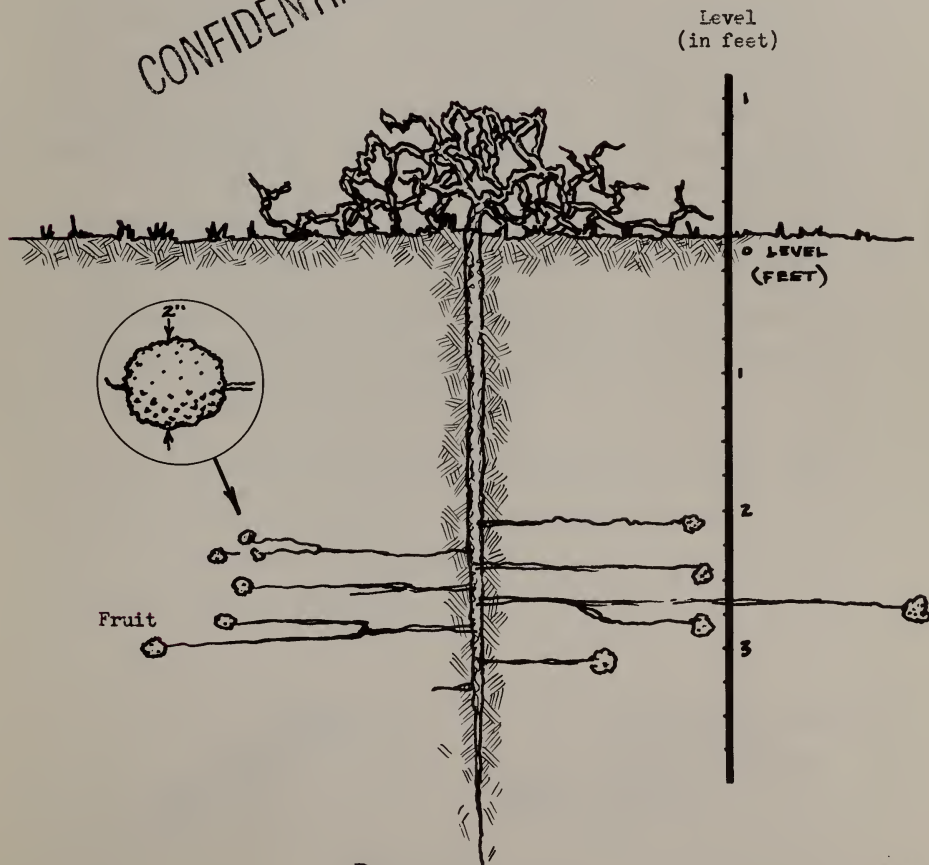
FROM Will Tellum

TO Arnold Edward : Mass. Int. Trdrs.

SUBJECT Methanian "Mulp" Plant

FILE NO. H 37649

CONFIDENTIAL



Received
Mass. Intergalactic Traders
21 March 2953

CONFIDENTIAL

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE 14, March 2953

FROM Will Tellum

TO Arnold Edwards

SUBJECT Methanian Lohocla Plant

FILE NO. HM 37648

One of the most sought after delicacy's on the planet Arcturus IV is a hard-shelled fruit known as Lohocla. This is a fruit of very high energy content, being very rich in alcohol. This fruit grows about one to two feet below the surface of the ground. It is about four inches long and two inches in diameter. Each plant bears about ten to fifteen lohoclas two times a season. (See attached sketch.)

The root structure is most unusual, as the sketch shows, and is in the shape of a hemispherical paraboloid. At the focus of the paraboloid a second part of the root receives the concentrated reflected rays of Red Arcturus and by some (as yet unknown) chemical process transmits this radiant energy to the developing fruit.

The plants are annuals but could as mentioned before, bear two crops per season if the fruit could be harvested without destroying the plant. At the present time only one crop is realized as the plants are dug up and destroyed at harvest time.

CONFIDENTIAL

Received
Mass. Intergalactic Traders
21 March 2953

CONFIDENTIAL REPORT

Terran Exporting Counsel Headquarters

DATE _____

FROM Will Tellum

TO Arnold Edward ; Mass. Int. Trdrs.

SUBJECT Methanian "Lohocla" Plant

FILE NO. HM 37648

CONFIDENTIAL

Level
(in feet)

1

0

-1

-2

-3

-4

-5

-6

-7

-8

-9

-10

-11

-12

-13

-14

-15

-16

-17

-18

-19

-20

-21

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-25

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-28

-29

-30

-31

-32

-33

-34

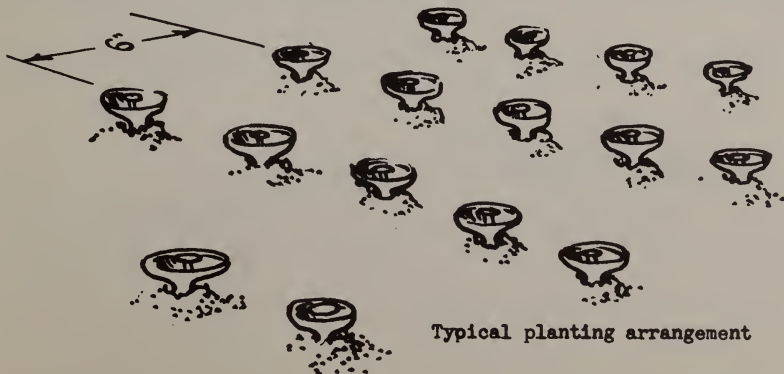
-35

Fruit



CONFIDENTIAL

Received
Mass. Intergalactic Traders
21 March 2958



Typical planting arrangement

INTER-OFFICE MEMO
Massachusetts Intergalactic Traders, Inc.

From: J. P. Johnston To: Arnold Edward
Subject: Project; Harvest Moon File No. 3463

CONFIDENTIAL

13 March 2953

After receiving your instructions, I have acted on the memo to try to improve existing methods of harvesting on Arcturus IV.

As I gathered from you, some simple device which would have a ready sale on Arcturus until some more efficient harvesting equipment could be developed was the chief prerequisite of this design. Therefore, we decided to work on some hand tools to supplement the shovels of the Methanians.

Since the most pressing problem at the moment is the inability of the Methanians to develop impact loads for cutting and breaking, we worked out a hand operated impact hammer to be used on an improved shovel.

The hammer is simply a cylindrical weight, which, under the force of a spring compressed by the operator, falls on an anvil attached to the shovel handle. The hammer gives an impact load of approximately 3000 lbs to break a root 1/4 inch in diameter, for example. (See accompanying calculations.) The overall weight of the impact hammer is 28 Arcturian pounds and it takes about 100 pounds to compress the main spring through its 4 inch travel.

As shown in the rendering, several improvements have been made on the Arcturian shovel. One is the "Dee" handle just above the foot rests on the back of the shovel blade. This handle helps the farmer to lift the dirt out of the hole he is digging. The foot (or I should say hoof) rests consist of the flat on the back of the shovel blade with a built up edge in front to keep the toe of the hoof from slipping off the shovel.

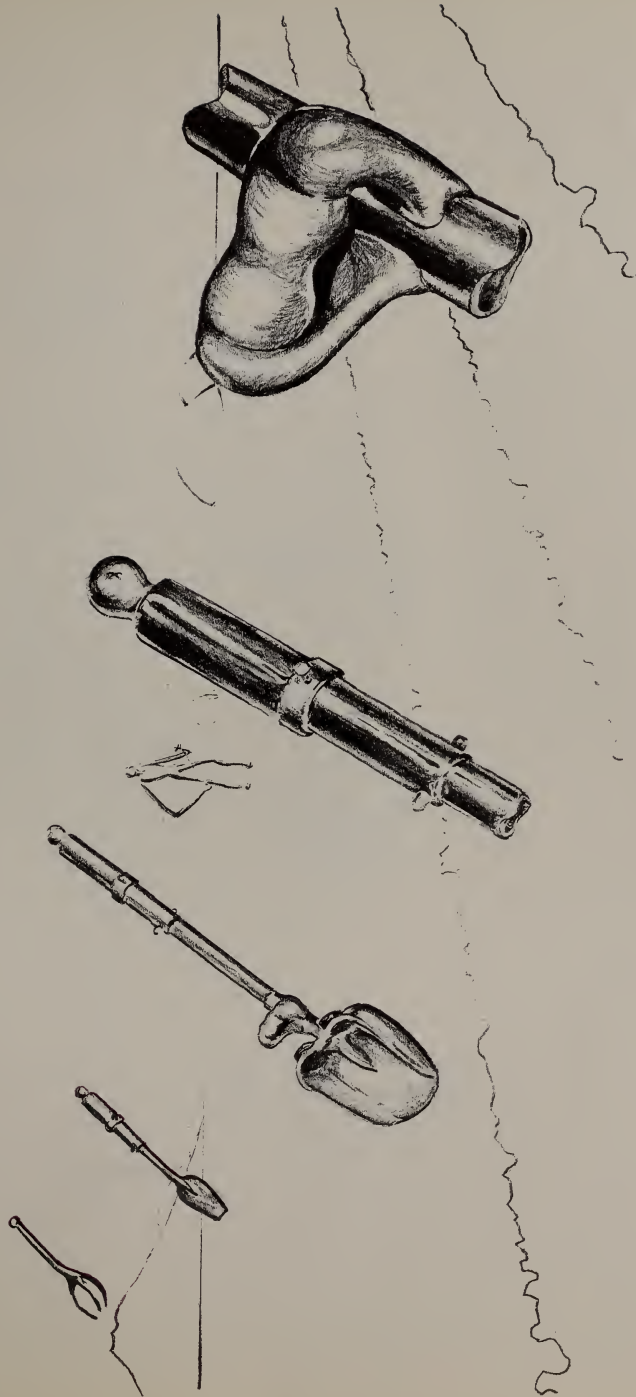
Also shown on the rendering are: a small pronged hand tool for loosening and prying fruit out of the ground if the fruit is near the surface, and an attachment for use with the impact hammer to cut heavier objects than is possible with the shovel blade.

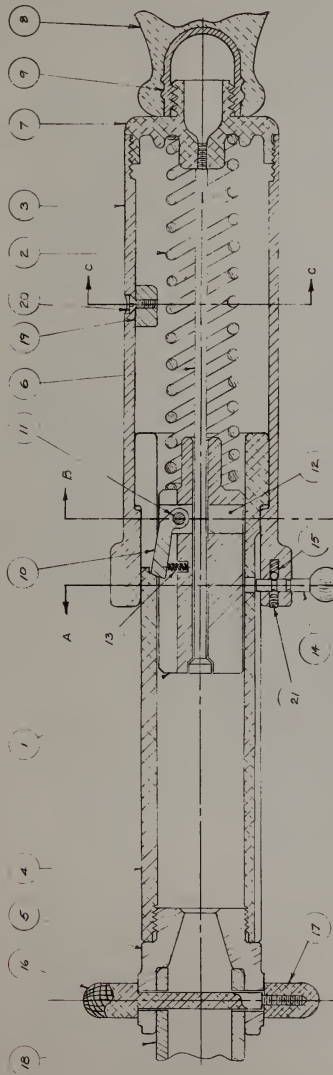
I am submitting this design with the hope that it meets with the committee's approval.

Nocturnally yours,

James P. Johnston

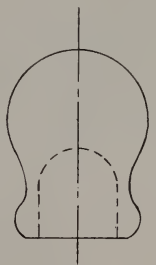
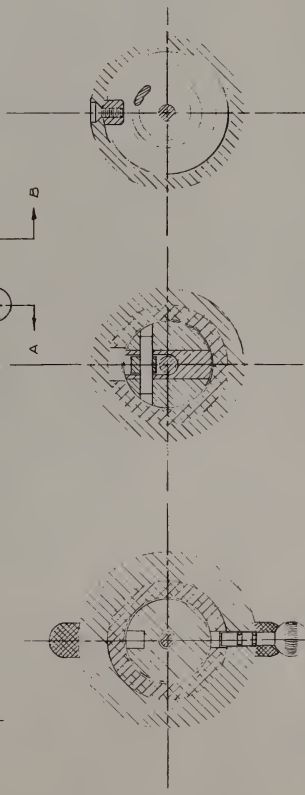
CONFIDENTIAL





PART NO	PARTS LIST	MATERIAL
1	HAMMER	STEEL
2	MAIN SPRING (K=25 1/2)	"
3	OUTER TUBE	ALUMINUM
4	INNER "	"
5	ANVIL	TITANIUM
6	RETURN ROD	(DIE CAST) MAGNESIUM
7	FEED PIECE	POLYETHYLENE
8	HAND GRIP	"
9	"	INSET ALUMINUM
10	HAMMER SEAR	STEEL
11	"	"
12	"	PIN "
13	"	SEAR SPRING "
14	SLIDE LOCK	"
15	"	BALL & SPRING "
16	FASTENING STUD	TITANIUM
17	"	"
18	END OF ACCESSORY	"
19	HAMMER SEAR CAM	TITANIUM
20	"	"
21	SET SCREW	STEEL

MAKE ONE OF EACH



PART 8
HAND GRIP

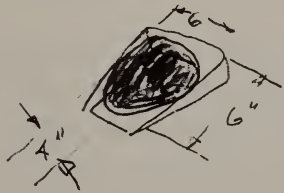
Society Polytechnic traders, Inc.			
TITLE		IMPACT	
ARCTURUS II		HAMMER	
18	19	20	21
18	19	20	21
AS SHOWN			
FULL			

TIME STUDY DATA

SHOVEL CAPACITY

$$4' \times 6' \times 6' = 36' \times 4' = 144' \text{ ft}^3$$

$$\text{CAP.} = \frac{144}{1730} = 0.083 \text{ ft}^3$$



$$\rho_{\text{soil}} = 270 \text{ lb (wt) / ft}^3$$

WT OF 1 SHOVEL FULL & 22#

TIME TO MOVE 1 ft³ OF EARTH

	<u>TIME</u>
1) PUSH SHOVEL INTO GROUND	= 2 sec
2) TILT TO FILL	= 20 sec
3) PICK UP FULL	= 10 sec
4) DEPOSIT DIRT	= 5 sec

{ TOTAL } → = 37 sec
(To move 0.083 ft³)

{ TIME TO MOVE 1 ft³
WITH 1.0 sec
REST BETWEEN
CYCLES } → = $\frac{47}{0.083} = 570 \text{ sec}$

TIME = 9.5 minutes / ft³

CONFIDENTIAL REPORT

Massachusetts Intergalactic Traders, Inc.

From: M. Deitz To: Arnold Edwards
Subject: Project Harvest Moon File No. MZ 4621

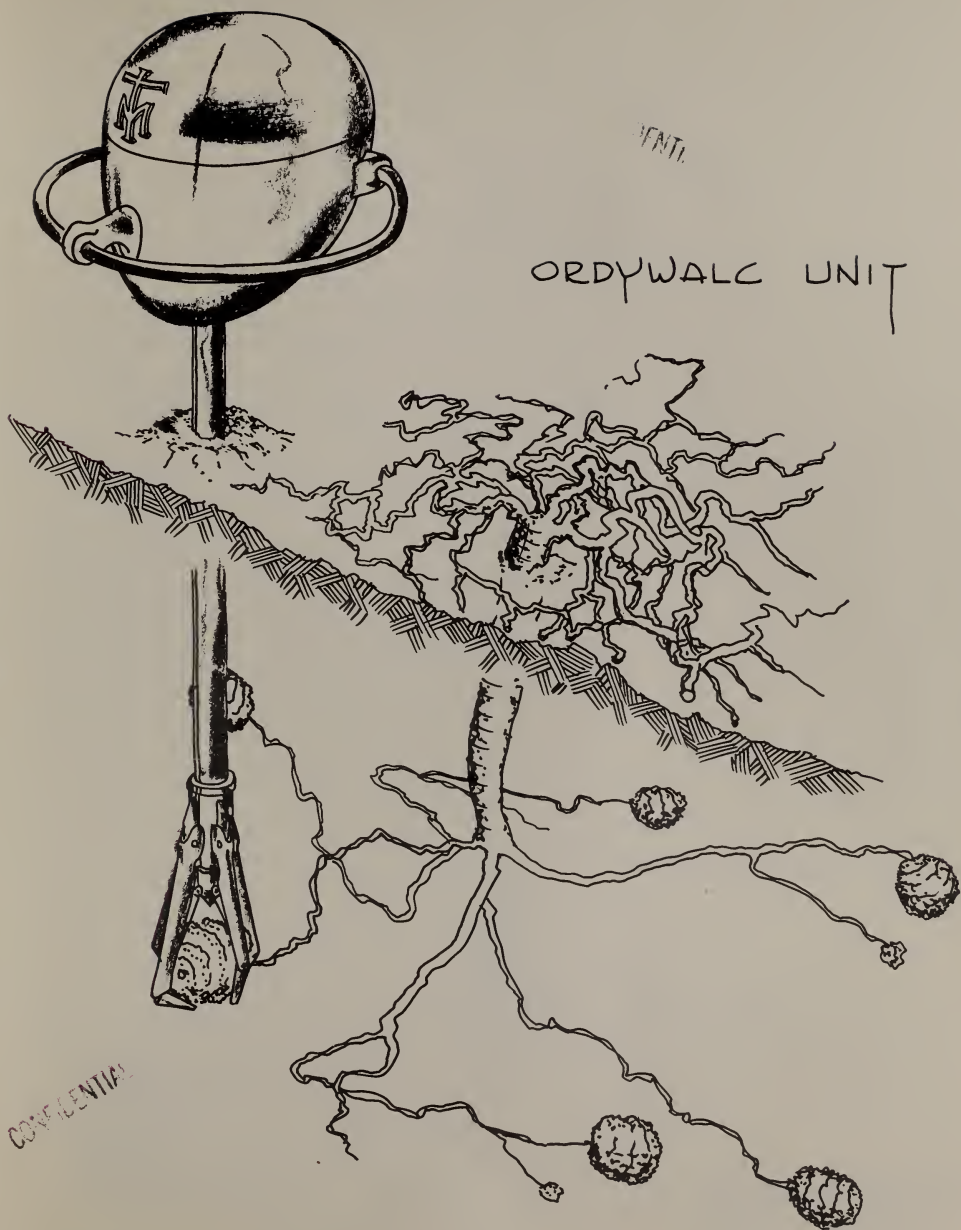
The following is a brief description of the Ordywalc harvesting tool and its use. It seemed to the writer that a portable tool capable of being handled by a few Methanians and obtaining its power from a mobile power source would be the best solution. It also seemed very desirable to have a harvesting tool that could be used without destroying the plants. The Ordywalc is such a mechanism.

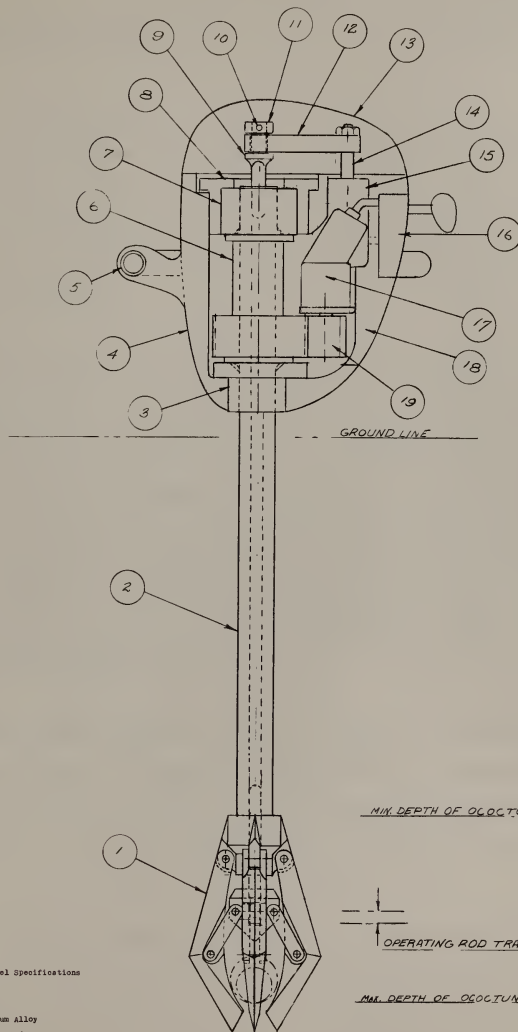
A claw mechanism was devised to clasp the fruit. The claw functions as a drill until it surrounds the fruit, its jaws are then closed and the machine started again and drawn out of the earth.. A hydraulic system was chosen to power the rotating claw head and also to close the claw jaws. The head is rotated by means of a hydraulic motor (5000 psi) directly coupled to the main torque tube through a gear reduction. This gives constant torque with speed dependent on the setting of the flow control lever. This one lever controls the rotation - e.g. off -- on, with intermediate points having linear speed deviations.

The claw is opened and closed by means of another lever which governs the flow of fluid to a hydraulic ram. This ram is linked to the claw operating rod which is inside the torque tube. The motor and ram both use tetrasilicane fluid as their driving medium. This is obtained from a self powered unit which serves as the base for three Ordywalc units and tows them on their auxillary dollys to the harvesting location. The Methane internal combustion engine powers a heavy duty pump which feeds the Ordywalc units through teflon cables reinforced with aluminum.

On arriving at a harvesting location the self-powered pressure generating station is stopped and the three dollys bearing the Ordywalcs are removed. The three man Ordywalc crew then wheel up one unit to a plant and go to work. Two men function as guide men and grasp the tubular handle while the other man directs them. The guidemen steady the unit and follow the instructions of the leader who controls the speed and watches the fruit with his x-ray eye. When the drill head

reaches the fruit, the claw grabs it, the machine is reversed and the fruit is harvested. The three man crew rotate their positions - - - thereby resting one Methanian from the physical effort of guiding the unit, and assuring that the leader, who must use his x-ray eye through out the cycle does not suffer eye fatigue.





Ordynalc

Parts List and Material Specifications

- 1- Glow Assembly- Titanium Alloy
- 2- Magnesium Alloy Torque Tube
- 3- Torque Housing
- 4- Main Housing Casting- Magnesium Alloy
- 5- Magnesium Timing Rod
- 6- Aluminum Gear & Spacer- Hardcoated
- 7- Torque Housing
- 8- Aluminum Timing Sleeve
- 9- Operating Rod - Titanium
- 10- Short Pin- Titanium
- 11- Rod Cap - Titanium
- 12- Line- Titanium
- 13- Cover- Titanium
- 14- Ram Housing - Aluminum
- 15- Aluminum Hydraulic Control Unit Casting
- 16- Hydraulic Motor
- 17- Hydraulic Unit Casting - Aluminum
- 18- Pinon- Hardcoated Aluminum

Massachusetts Intergalactic Traders, Inc.	
FOR: <i>Nepharia</i>	TITLE: <i>ORDYNALC</i>
SCALE: <i>1/2 SIZE</i>	DATE: <i>MAR 12, 1959</i>
DESIGNER: <i>MSD</i>	CHK: <i>Prelim. Engr. Laport. I</i>

CONFIDENTIAL REPORT

Massachusetts Intergalactic Traders, Inc.

From: Reiter

To: Arnold Edwards

Subject: Project Harvest Moon

File No. RQ 1375

This device, designed along the lines of a pneumatic hammer, is intended to aid in the cultivation and harvesting of the Arcturian plants which are characterized by their growth in hard, compacted soil. Under such conditions a great amount of labor must be expended simply in breaking up the soil in either the process of cultivation or in the initial steps of removing soil for the purpose of harvesting.

Due to the fact that all previous Arcturian agricultural work has been carried out with hand tools, I have felt it advisable to retain as far as possible the scale and character of the hand tool in designing a powered device, since some reaction may be experienced against the more complex and advanced mechanisms. This soil breaker is intended both to supply an intermediate step between hand work and full mechanization and to allow easier handling of such plants as require individual cultivation and harvesting. I believe that by holding size and weight (86 Arcturian pounds) to a minimum, a useful tool may be created which will, in addition, form a development stage in the Arcturian conversion to mechanized agriculture.

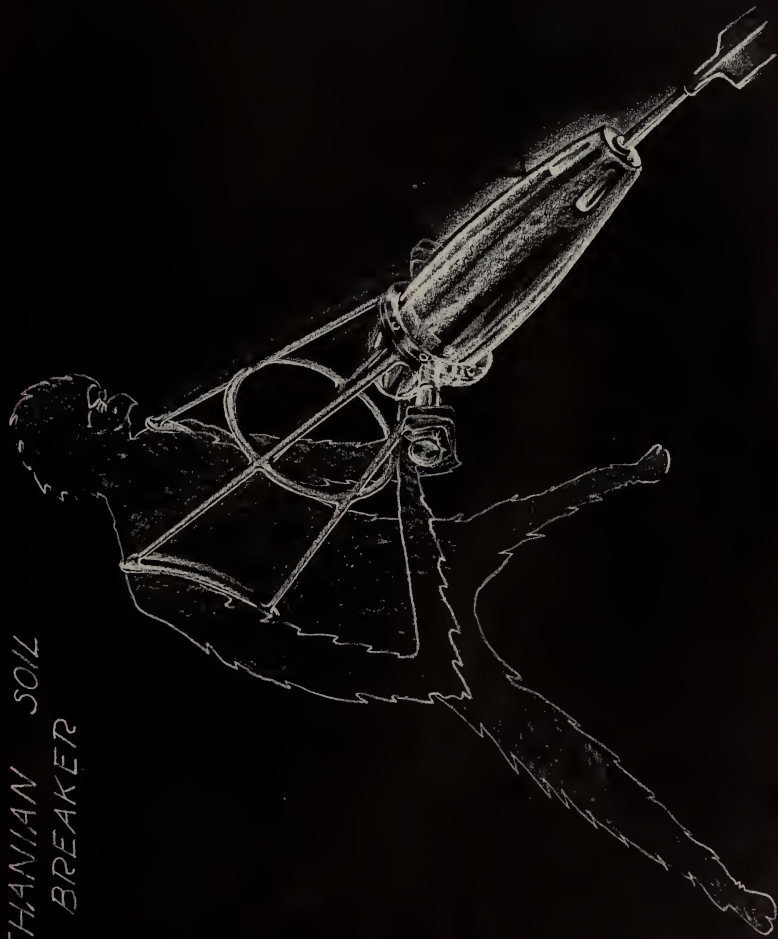
This pneumatic agricultural tool gains a degree of flexibility, since the blades themselves may be changed to suit conditions encountered, and since the large shoulder braces, intended for work against the soil, may be removed, allowing the device to extend its usefulness to construction work and special tasks which must be carried out in close quarters.

All calculations and supplementary design sketches may be found in design folder ZQ 1735.

CONFIDENTIAL

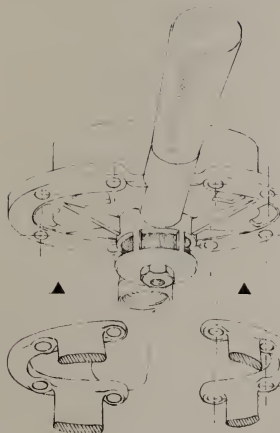
Reiter

METHANIAN SOIL
BREAKER

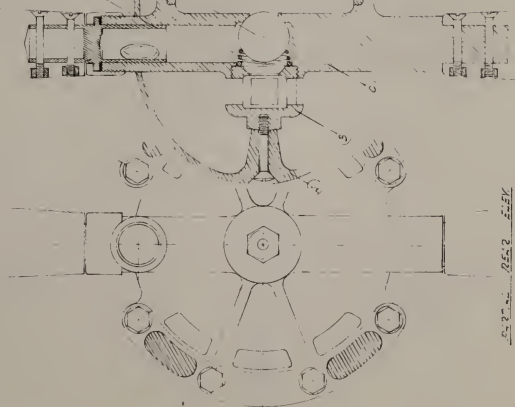


REITER

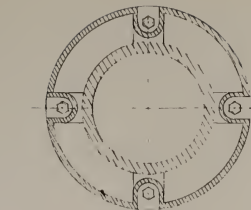
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SECTION A-A



SECTION B-B



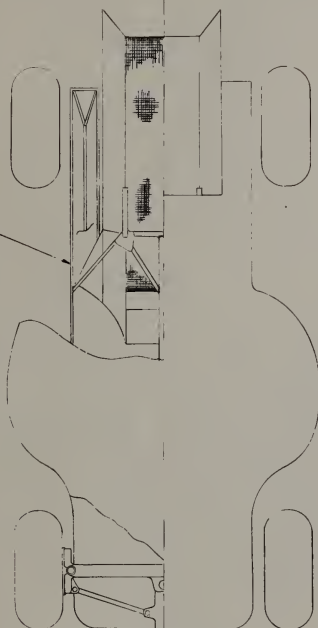
SECTION C-C



FOR		TITLE	
NO.	REV.	DATE	BY
NOTE: ALL DIMENSIONS ARE IN INCHES. FRACTIONS ARE TO BE SHOWN IN DECIMALS. TOLERANCES ARE AS SHOWN. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE HOLD.			
MATERIAL		TREATMENT	
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7-22-47

WELDED TUBULAR FRAME



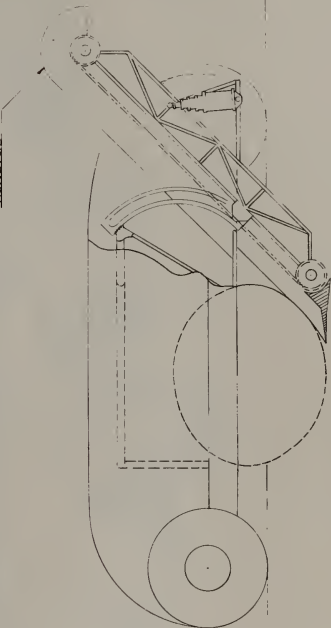
MASSACHUSETTS INTERGALACTIC TRIDENS
 RETURN TO MANUFACTURING PLANT



GROUP
 1-1-1

DESIGNED
 CHAR. R. BROWN

CONTRACT



GROUP
 1-1-1

